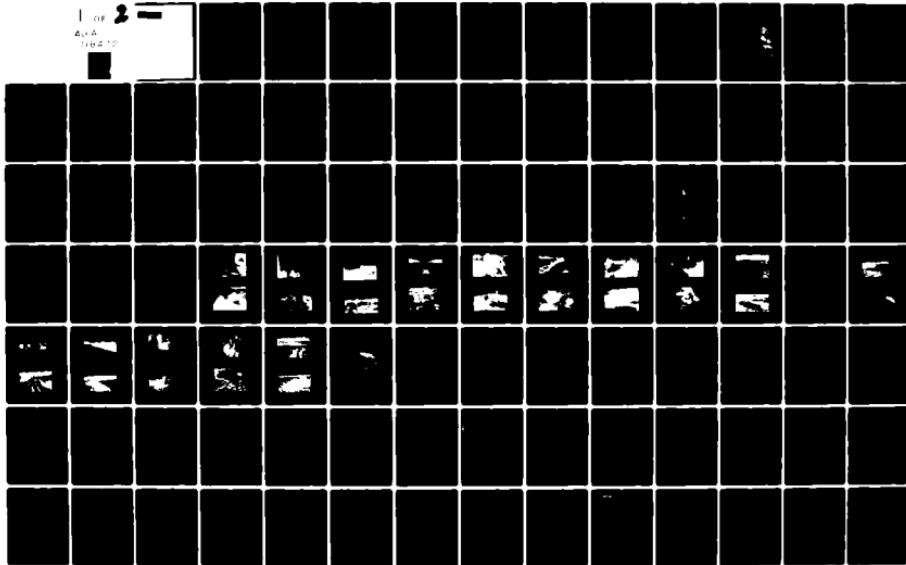


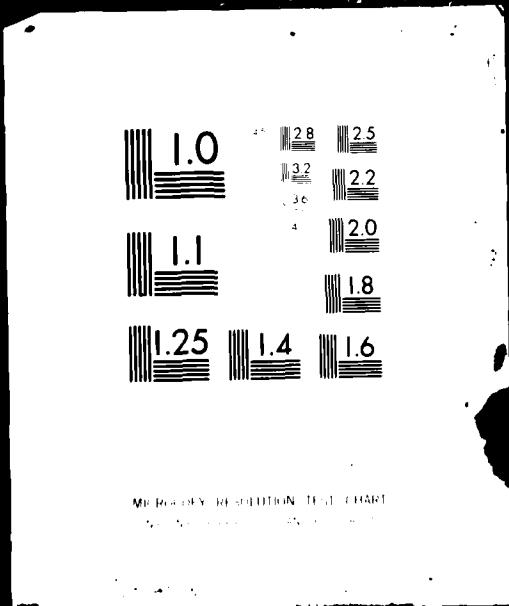
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle) National Program of Inspection of Non-Federal Dams Tennessee. Marys Creek Dam No. 8 (Inventory Number TN 15727) near Cross Roads, Tennessee, Shelby County, TN, Wolf River Basin		5. TYPE OF REPORT & PERIOD COVERED Phase 1 Investigation Report	
7. AUTHOR(s)	6. CONTRACT OR GRANT NUMBER(s) DACW-62-81-C-0056		
9. PERFORMING ORGANIZATION NAME AND ADDRESS Tennessee Department of Conservation Division of Water Resources 4721 Trousdale Dr., Nashville, TN 37220	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS		
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Nashville P.O. Box 1070 Nashville, TN 37202	12. REPORT DATE September, 1981		
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	13. NUMBER OF PAGES		
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18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dams Dam Safety National Dam Safety Program Marys Creek Dam No. 8, TN Cross Roads, TN      Shelby County, TN Embankments Visual Inspection Structural Analysis			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Mary's Creek Watershed Dam No. 8 is a curvilinear earthen structure 1120 feet long and 30.0 feet high with a crest width of 12 feet. The upstream and downstream slopes are 1V:2.4H and 1V:3.5H respectively. At normal pool, the 25 acre lake has a storage capacity of 149 acre-feet. At the top of the dam the pool area increases to 45 acres with an impoundage of 380 acre-feet. The drainage area for the lake is 286 acres. It is predominantly pasture and woodland with an average ground slope of approximately 5.6%. The dam is uniform, well grassed, and clear of any deleterious vegetation. The upstream			

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(slope of the embankment shows appreciable sloughing near the principal spillway. Scattered minor depressions appear sporadically along the downstream slope, presumably the result of dispersive soil. There are no indications of seepage on the slope or in the area downstream of the dam. No signs of differential settlement or other slope instabilities were observed.) The principal spillway is a reinforced concrete riser with an approximate 3 foot square flow area. It feeds a 24 inch asbestos cement pipe approximately 180 feet long. The drawdown is a 12 inch formed opening controlled by a 12 inch manually operated sliding headgate. According to the owner, the drawdown has always leaked extensively, so to minimize the flow, the inlet was clogged with clay several years ago. The emergency spillway is an uncontrolled earthen saddle type channel with a trapezoidal cross-section located at the left end of the dam. It has a top width of 57 feet and 2.6 feet of available head (2.9 feet to top of dam). It is well grassed and has a reasonably uniform cross-section. Appreciable erosion occurs near the water surface and along the upstream left side slope, apparently the result of cattle congregating in these areas. The dam is in the high hazard potential and small size classifications. OCE guidelines require such dams to pass the one-half probable maximum flood (1/2 PMF) to full PMF. Hydraulic and hydrologic analyses reveal that the emergency spillway is capable of passing the 1/2 PMF without causing the dam to overtop nor breach during the storm. The upstream dam will overtop under the 1/2 PMF. Should failure of the upstream dam occur, analysis indicates that Mary's Creek Dam will be overtopped by 0.2 feet for 1.8 hours. The dam is given a condition classification of "Deficient" because of the erosion near the emergency spillway entrance and elsewhere along the upstream slope.

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DEPARTMENT OF THE ARMY  
NASHVILLE DISTRICT, CORPS OF ENGINEERS  
P. O. BOX 1070  
NASHVILLE, TENNESSEE 37202

IN REPLY REFER TO

ORNED-G

21 SEP 1972

Honorable Lamar Alexander  
Governor of Tennessee  
Nashville, TN 37219

Dear Governor Alexander:

Furnished herewith is the Phase I Investigation Report on Marys Creek Watershed Dam No. 8 near Crossroads, Tennessee. The report was prepared under the authority and provisions of PL 92-367, the National Dam Inspection Act, dated 8 August 1972.

The report presents details of the field inspection, background information, technical analyses, findings, and recommendations for improving the condition of the dam.

Based upon the inspection and subsequent evaluation, Marys Creek Watershed No. 8 is classified as deficient due to insufficient storage and spillway capacity to pass the one-half probable maximum flood and minor erosion of the dam.

We do not consider this an emergency situation at this time, but the recommendation concerning project modifications to allow safe passage of the design flood and others contained in this report should be undertaken in the near future.

Public release of the report and initiation of public statements fall within your prerogative. However, under provisions of the Freedom of Information Act, the Corps of Engineers is required to respond fully to inquiries on information contained in the report and to make it accessible for review on request.

Your assistance in keeping me informed of any further developments will be appreciated.

Sincerely,

*Lee W. Tucker LTC*  
For LEE W. TUCKER  
Colonel, Corps of Engineers  
Commander

I Incl  
As stated

CF:  
Mr. Robert A. Hunt, Director  
Division of Water Resources  
4721 Trousdale Drive  
Nashville, TN 37220

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
TENNESSEE

Name of Dam ..... Mary's Creek  
Watershed Dam #8

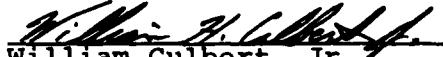
County ..... Shelby

Stream ..... Unnamed Trib. of  
Mary's Creek

Date of Inspection ..... March 11, 1981

This investigation and evaluation was prepared by the  
Tennessee Department of Conservation, Division of Water  
Resources.

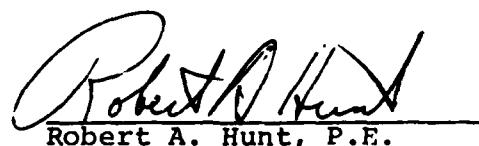
Prepared By:

  
William Culbert, Jr.  
Water Resources Engineer

Approved By:

  
Edmond B. O'Neill  
Chief Engineer  
Safe Dams Section

Approved By:

  
Robert A. Hunt, P.E.  
Director, Division of  
Water Resources  
Tennessee Department  
of Conservation

## PREFACE

This report is prepared under guidance contained in the Department of the Army, Office of the Chief of Engineers, Recommended Guidelines for Safety Inspection of Dams, for a Phase I investigation. The purpose of the Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In the review of this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. Additional data or data furnished containing incorrect information could alter the findings of this report. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structures and may obscure certain conditions which might be detectable if inspected under the normal operating environment of the structure.

The analyses and recommendations included in this report are related to the hazard classification of the structure at the time of the report. Changes in conditions downstream of the dam may change the hazard classification of the structure. A change in hazard classification may in turn change the design flood on which the hydraulic and hydrologic analyses are based and may have a significant impact on the assessment of the safety of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the present conditions of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspections can there be any chance that unsafe conditions will be detected.

## TABLE OF CONTENTS

	<u>Page</u>
Aerial Photograph	
Abstract	
SECTION 1 - GENERAL	
1.1 Authority	1
1.2 Purpose and Scope	1
1.3 Past Inspections	1
1.4 Details of Inspection	1
1.5 Inspection Team Members	1
SECTION 2 - PROJECT DESCRIPTION	
2.1 Location	2
2.2 History of Project	2
2.3 Upstream Dam	2
2.4 Size and Hazard Classification	3
2.5 Description of Dam and Appurtenances	3
2.6 Downstream Channel	4
2.7 Reservoir and Drainage Area	4
SECTION 3 - FINDINGS	
3.1 Visual Inspection	5
3.2 Review of Data	6
3.3 Static and Seismic Stability Assessment	6
3.4 Hydraulic and Hydrologic Analysis	7
3.5 Conclusions and Recommendations	7
SECTION 4 - REVIEW BOARD FINDINGS	9

## LIST OF APPENDICES

### APPENDIX

- A DATA SUMMARY
- B SKETCHES AND LOCATION MAPS
- C PHOTOGRAPHIC RECORD
- D TECHNICAL CRITIQUE - CHECKLISTS FOR  
VISUAL INSPECTION, ENGINEERING DATA,  
SOIL TESTS
- E DESIGN DRAWINGS
- F HYDRAULIC AND HYDROLOGIC DATA
- G CORRESPONDENCE



MARY'S CREEK WATERSHED DAM NO. 8  
SHELBY COUNTY  
MARCH 27, 1981

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
TENNESSEE

Name of Dam ..... Mary's Creek Watershed Dam No. 8  
County ..... Shelby  
Stream ..... Unnamed Tributary of Mary's Creek  
Date of Inspection ..... March 11, 1981

ABSTRACT

Mary's Creek Watershed Dam No. 8 is a curvilinear earthen structure 1120 feet long and 30.0 feet high with a crest width of 12 feet. The upstream and downstream slopes are 1V:2.4H and 1V:3.5H respectively. At normal pool, the 25 acre lake has a storage capacity of 149 acre-feet. At the top of the dam the pool area increases to 45 acres with an impoundage of 380 acre-feet. The drainage area for the lake is 286 acres. It is predominantly pasture and woodland with an average ground slope of approximately 5.6%.

The dam is uniform, well grassed, and clear of any deleterious vegetation. The upstream slope of the embankment shows appreciable sloughing near the principal spillway and especially near the emergency spillway. Scattered minor depressions appear sporadically along the downstream slope, presumably the result of dispersive soil. There are no indications of seepage on the slope or in the area downstream of the dam. No signs of differential settlement or other slope instabilities were observed.

The principal spillway is a reinforced concrete riser with an approximate 3 foot square flow area. It feeds a 24 inch asbestos cement pipe approximately 180 feet long. The drawdown is a 12 inch formed opening controlled by a 12 inch manually operated sliding headgate. According to the owner, the drawdown has always leaked extensively, so to minimize the flow, the inlet was clogged with clay several years ago.

The emergency spillway is an uncontrolled earthen saddle type channel with a trapezoidal cross-section located at the left end of the dam. It has a top width of 57 feet and 2.6 feet of available head (2.9 feet to top of dam). It is well grassed and has a reasonably uniform cross-section. Appreciable erosion occurs near the water surface and along the upstream left side slope, apparently the result of cattle congregating in these areas.

Mary's Creek Watershed Dam #8 is in the "high" hazard potential and "small" size classifications. OCE guidelines require such dams to pass the one-half probable maximum flood ( $\frac{1}{2}$  PMF) to full PMF. Hydraulic and hydrologic analyses reveal that the emergency spillway is capable of passing the  $\frac{1}{2}$  PMF without causing the dam to overtop provided a dam immediately upstream (Stotts Dam) does not breach during the storm. Further analysis reveals that the upstream dam will overtop under the  $\frac{1}{2}$  PMF. Should failure of the upstream dam occur, analysis indicates that Mary's Creek Dam will be overtopped by 0.2 feet for 1.8 hours.

The dam is given a condition classification of "deficient" because of the erosion near the emergency spillway entrance and elsewhere along the upstream slope.

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
MARY'S CREEK WATERSHED DAM NO. 8  
SHELBY COUNTY, TENNESSEE

SECTION 1 - GENERAL

- 1.1 Authority - The Phase I inspection of this dam was carried out under the authority of Tennessee Code Annotated, Sections 70-2501 to 70-2530, The Safe Dams Act of 1973, and in cooperation with the U. S. Army Corps of Engineers under the authority of Public Law 92-367, The National Dam Inspection Act.
- 1.2 Purpose and Scope - The purpose of a Phase I investigation is to develop an engineering assessment of the general condition of a dam with respect to safety and stability. This is accomplished by conducting a visual inspection; reviewing any available design and construction data; and performing appropriate hydraulic, hydrologic, and other analyses. A comprehensive description of the Phase I investigation program is given in Recommended Guidelines for Safety Inspection of Dams, by the Department of the Army, Chief of Engineers, Washington, D. C. 20314.
- 1.3 Past Inspections - The site was surveyed by state personnel as part of the pre-inspection reconnaissance on February 18, 1981.
- 1.4 Details of Inspection - The Phase I inspection of Mary's Creek Dam No. 8 was conducted on March 11, 1981. The weather was sunny and breezy with a temperature of 70° F.
- 1.5 Inspection Team Members - The field inspection was conducted by the following State personnel:  
  
Edmond O'Neill, Chief Engineer  
George Moore, Regional Engineer  
William Culbert, Jr., Regional Engineer

## SECTION 2 - PROJECT DESCRIPTION

2.1 Location - The dam is located in Shelby County, Tennessee, 1.5 miles southeast of the Fisherville community at mile 1 of an unnamed tributary confluent with Mary's Creek at approximate mile 5. The site is shown on the USGS Eads quadrangle map (416NW) at 35°08'45" north latitude and 89°38'59" west longitude. (See Appendix B for location maps).

2.2 History of Project - Mary's Creek Watershed Dam #8 was constructed as a flood retention structure in 1954 by McCormick Construction Company of Covington, Tennessee (no longer in business) under the authority of the Pilot Watershed Program established by an act predating Public Law 566. The project was sponsored by Shelby and Fayette County Soil Conservation Districts with assistance from the Wolf River Watershed Association, the SCS, and various other agencies of the Department of Agriculture. The property is owned by L.E. Bryant, and the Shelby and Fayette County Soil Conservation Districts are responsible for operating and maintaining the site with labor, materials, and funding provided by the Wolf River Watershed Association, county courts, and local landowners.

In 1957, severe jugging on the downstream slope provided sufficient impetus for the SCS to have 3 feet of fill material removed from the surface of the slope and replaced with new material. In the early 1960's, the SCS implemented an alteration to the dam with the help of farm labor. The riser and corresponding normal pool elevation were raised 5 feet. The dam height was raised 4 feet by the addition of new fill material over the downstream slope and crest. This required that the principal spillway culvert be extended downstream into the plunge pool with an additional 16 foot section of asbestos cement pipe.

2.3 Upstream Dam - Stotts Dam is located approximately 800 feet upstream of Mary's Creek Lake. It is owned by Cedar Hill Farms (Tolly Murff and T. G. Barbee, principal shareholders). The dam is 17 feet high, 422 feet long, with a maximum impounding capacity of 54 acre-feet. The drainage area is 41 acres.

Hydraulic analysis indicates that the ½ PMF will overtop the dam. Routing the breach hydrograph from Stotts, downstream, indicates that the Mary's Creek Dam will also be overtopped under this flood condition. Data for Stotts Dam is given in Appendices A, B, C, D, and F following data for Mary's Creek.

2.4      Size and Hazard Classification - Based on a structural height of 30 feet and a maximum storage capacity of 380 acre-feet, the dam is given a size classification of "small". A federal hazard classification of "high" was chosen for the dam because a sudden failure of the structure could result in the deaths of several persons living in the two homes near the channel approximately 4600 feet downstream of the dam.

2.5      Description of Dam and Appurtenances

2.5.1      Embankment - The dam is a curvilinear earthen structure 1120 feet long and 30 feet high with a crest width of 12 feet. The upstream and downstream slopes are 1V:2.4H and 1V:3.5H respectively. The dam crest elevation varies from 369.6 feet to 371.4 feet msl. (Elevations referenced to pool surface as given on USGS quadrangle.)

Review of geologic quadrangle maps of the area and the regional state geologic map indicate that the area is overlain predominantly with Memphis and Grenada soils derived from deep Loess brown loam. Collins and Falayia are the principal bottom soils. (Loess soils consist of clayey and sandy silt, gray to brown, with a maximum thickness of 20 to 35 feet in the Wolf River tributaries area with a 40-50 foot thick fuluvial formation deep to this.) Being wind blown material, the Loess lays in about equal thickness through extensive changes in elevation, so deeper formations cannot be identified without borings. No boring profiles are provided in the design drawings.

The design specifies a cutoff trench with a 10 foot base and 1:1 side slopes to be excavated along the centerline of the dam to a low point elevation approximately equal to that of the principal spillway outlet invert. Sixty feet upstream of the outlet is the design location of an SCS box type embankment drain, 4 feet square by 550 feet long. A 6" helical corrugated metal pipe discharges to the right of the principal spillway.

2.5.2 Service Spillway and Drawdown - The principal spillway consists of a 17 foot tall reinforced concrete riser with an approximately 3 foot square flow area. The riser feeds a 24 inch asbestos cement culvert 180 feet long. Three 8.5' X 12.5' antiseep collars are located along the culvert on 26 foot centers. The drawdown is a 12 inch formed opening at the upstream base of the riser controlled by a 12 inch manually operated gate valve (see photo no. 7).

2.5.3 Emergency Spillway - The emergency spillway is an uncontrolled saddle type channel located at the left end of the dam. It has a trapezoidal cross-section with a 25 foot base width and approximately 1V:7H side slopes. The spillway has 2.6 feet of available head within its horizontal boundaries but provides 2.9 feet of head at what is considered the effective low point in the dam crest, elevation 369.6 (see sheet 5 of sketches).

Approximately 106 feet to the right of the dam is a small open channel following the natural contour of the abutment. It has a width of 20 feet at the top of the dam with 1.1 feet of available head. The channel was apparently excavated as part of a terracing system (see photo no. 1). The hydraulic capacity of the channel was considered in the flood routing.

2.6 Downstream Channel - The natural channel downstream of the embankment lies on approximately a 0.5% slope. It is 10 to 12 feet wide and 5 to 8 feet deep. It can be approximated as a trapezoidal channel with a relatively flat base and side slopes ranging from 1:1 to almost vertical.

2.7 Reservoir and Drainage Area - At normal pool the reservoir has a surface area of 24.8 acres and a storage capacity of 149 acre-feet. At maximum pool, the surface area is 45 acres with 380 acre-feet of total storage.

The drainage area of the basin is 286 acres (245 acres excluding drainage area of Stotts Lake Dam) with an average ground slope of approximately 5.6%. The area is predominantly woodland and pasture with major surface soils of Memphis, Loring, and Grenada.

### SECTION 3 - FINDINGS

#### 3.1 Visual Inspection

3.1.1 Embankment - The embankment is free of trees and other woody vegetation except for one large bush at the left downstream toe of the linear portion of the dam and a few small coniferous seedlings.

The structure is free of observable seepage with no noticeable wet areas along the downstream slope. There are, however, some small inactive depressions on the downstream slope. They are presumably the result of cattle traffic or poor grading during construction.

Immediately downstream of the dam near mid-section a terrace excavation has left a 100 square foot low area 2 feet deep with a gully trench that tapers away to an intersection with the plunge pool. The depressed area has a wet base and the gully contains a small amount of pooled water near its downstream end, apparently the result of surface runoff. If it is the result of seepage, there was no observable flow and it would appear to be of little consequence.

The upstream slope of the dam is significantly eroded in the area of the riser and at the emergency spillway entrance. Both upstream and downstream slopes have a good Bermuda grass cover (see photo nos. 6, 9, and 10).

The downstream slope of the dam is flat and well grassed with no significant deleterious vegetation. It exhibits no signs of seepage or differential settlement.

The crest of the dam is flat, uniform, and well grassed.

3.1.2 Service Spillway and Drawdown - The spillway riser appears to be in good condition as viewed from the dam. There appears to be no broken or lost timbers from the anti-vortex baffle or floor cap (see photo no. 7). The spillway outlet is submerged in the plunge pool and was inaccessible for inspection (see photo nos. 13 and 14).

According to the owner, the drawdown leaked extensively for several years after construction. The valve was considered to be poorly designed and its use was discontinued by the SCS soon afterwards. To remedy the leakage problem, clay was dumped at the inlet. A leakage flow of only a few gallons per minute was observed at the outlet during the inspection (see photo no. 13).

3.1.3 Emergency Spillway - The emergency spillway has a reasonably uniform cross-section. It has a good grass cover and is clear of undesirable vegetation. There is appreciable erosion on the left side slope from near the water surface to the control section (see photo nos. 17 and 18). Erosion at the upstream right side slope is more severe but represents little danger to the structure because it occurs on the end wall upstream of the embankment (see photo nos. 9 and 10).

3.1.4 Downstream Channel - The stream channel downstream of the dam is adequately protected with natural cover. Four and six inch median diameter trees grow along most of the bank (see photo nos. 11 and 12). The side slopes of the channel are relatively steep and the base is flat with no significant erosion.

3.2 Review of Data - Information reviewed for the preparation of the report includes the Watershed Work Plan for Mary's and Sand Creek tributaries and the SCS design plans. Information from the review of this data is incorporated into the report.

3.3 Static and Seismic Stability Analysis - The dam is in Seismic Zone 3, indicating that damage from seismic activity would be major. The actual margin of safety for static stability was not determined because an analytical stability analysis is beyond the scope of this report. Consequently, the assessment of embankment stability must be based on visual evidence and engineering judgment. No signs of instability were observed.

**3.4** Hydraulic and Hydrologic Analysis - According to OCE guidelines, dams in the small size and high hazard categories are required to pass the one-half probable maximum flood ( $\frac{1}{2}$  PMF) to the full PMF.

Hydraulic and hydrologic analysis of Mary's Creek drainage area under the influence of the  $\frac{1}{2}$  PMF, assuming no breach of the upstream dam, indicates that the Mary's Creek Reservoir has sufficient flood storage to contain the  $\frac{1}{2}$  PMF providing 0.71 feet of freeboard.

The dam will overtop by a maximum of 0.2 feet for 1.8 hours under the  $\frac{1}{2}$  PMF incorporating failure of Stotts Lake Dam. (See Appendix A and Appendix F for hydrologic details of Stotts Dam).

**3.5** Conclusions and Recommendations

**3.5.1** Conclusions - The dam shows no significant signs of structural instability.

The dam is located in Seismic Zone 3, indicating that risk of damage due to seismic activity is major.

Analysis indicates that the emergency spillway is inadequate to pass the  $\frac{1}{2}$  PMF in addition to a failure of the Stotts Dam upstream. This spillway is not considered to be seriously inadequate, however, because the depth and duration of overtopping are not considered great enough to fail the dam.

There is appreciable sloughing of a few areas on the upstream slope.

The dam is given a condition classification of "deficient" because of the minor erosion occurring on the upstream slope and because of the marginal spillway adequacy.

**3.5.2** Recommendations - The Shelby County Soil Conservation District should:

- a. Provide erosion protection for the upstream slope and repair any other areas of erosion occurring on the dam.

- b. Develop an emergency action plan to warn downstream residents in the event a serious problem develops with the dam.
- c. Establish a program of regular inspection and maintenance.
- d. A qualified engineer should be retained to:
  - 1. Evaluate the stability of the embankment under seismic loading condition.
  - 2. Make recommendations for restoring the lake drawdown facilities to an operable condition.
  - 3. Make recommendations to expose the principal spillway and embankment drain outlets.

SECTION 4 REVIEW BOARD FINDINGS

The Interagency Review Board for the National Program of Inspection of Non-Federal Dams met in Nashville on 30 July 1981 to examine the technical data contained in the Phase I investigation report on Mary's Creek Watershed Dam No. 8. The Review Board considered the information and recommended that (1) the data relating to the failure of Stott's Dam through structural failure alone or through failure during the  $\frac{1}{2}$  PMF should be included in the report, (2) the report should conclude that the dam would probably not fail if it were overtopped by 0.2 ft. for 1.8 hours during the  $\frac{1}{2}$  PMF, (3) a qualified engineer should be engaged to perform an embankment stability analysis to determine if the dam meets seismic stability requirements, and (4) recommendation "d" should be revised to include the services of a qualified engineer to investigate the feasibility of lowering the water level in the stilling basin. The engineer should also investigate and make recommendations for the repair of the drawdown facilities. They agreed with other report conclusions and recommendations. A copy of the letter report presented by the Review Board is included in Appendix C.

**APPENDIX A**  
**DATA SUMMARY**

MARY'S CREEK NO. 8

APPENDIX A  
DATA SUMMARY

A.1 Dam

A.1.1 Type - Earthfill

A.1.2 Dimensions and Elevations

- a. Crest length - 1120 feet
- b. Crest width - 12 feet
- c. Height - 30.0 feet (downstream pipe invert to low point in crest)
- d. Crest elevation (low point) - 369.6
- e. Upstream slope - 2.4H:1V
- f. Downstream slope - 2.5H:1V
- g. Size classification - Small

A.1.3 Zones, Cutoffs, Grout Curtains - The embankment is comprised of homogeneous fill material. A cutoff trench was designed to be constructed along the dam centerline with a base width of 10 feet, 1:1 side slopes, and a maximum depth approximately equal to that of the invert of the principal spillway outlet.

A.1.4 Instrumentation - None

A.2 Reservoir and Drainage Area

A.2.1 Reservoir

a. Normal Pool

- 1) Elevation - 363 (msl)
- 2) Surface area - 24.8 acres ( $0.039 \text{ mi}^2$ )
- 3) Capacity - 149 acre-feet
- 4) Length - 2130 feet

b. Maximum Pool (top of dam)

- 1) Elevation - 369.6 (msl)
- 2) Surface area - 45 acres
- 3) Total capacity - 380 acre-feet

#### A.2.2 Drainage Area

- a. Size - 286 acres (total)  
245 acres (excluding drainage area of  
Stotts Lake upstream)
- b. Average ground slope - Approximately 5.6%
- c. Soils - Memphis 64%(B), Loring 22%(B),  
Grenada 14%(C)
- d. Land use - 50% pasture, 35% woodland,  
12% water, 3% residential
- e. Runoff (AMC II)
  - 1) PMF - 24.7 inches
  - 2)  $\frac{1}{2}$ PMF - 12.5 inches
  - 3) 100 year flood - 2.3 inches

#### A.3 Outlet Structures

##### A.3.1 Service Spillway

- a. Type - Asbestos cement circular culvert
- b. Size - 24 inch inside diameter
- c. Pipe gradient - 3.6%
- d. Drawdown - 12 inch formed opening controlled  
by 12 inch manually operated sliding  
headgate

##### A.3.2 Emergency Spillway

- a. Type - Open channel saddle; trapezoidal  
cross-section
- b. Crest elevation - 366.9 feet msl (effective)
- c. Size - Base-25 feet  
Side slopes-7H:1V  
T-57 feet  
Head-2.9 feet
- d. Maximum capacity - 360 cfs

#### A.4 Historical Data

A.4.1 Construction Date - Originally constructed  
in 1951; renovated in approximately 1958

A.4.2 Designer - Soil Conservation Service

A.4.3 Builder - Originally McComick Construction  
Company, Covington, Tennessee; alteration  
by Rollin Wiggs of Cedar Hill Farms,  
Memphis, Tennessee

A.4.4 Owner - L. E. Bryan

A.4.5 Previous Inspections - State personnel performed pre-inspection reconnaissance survey on February 18, 1981.

A.4.6 Seismic Zone - 3

A.4.7 Operation and Maintenance - The Shelby County Soil Conservation District is responsible for operation and maintenance of the structure by open market purchase with limited funds provided primarily by Shelby and Fayette County courts.

A.5 Downstream Hazard Data

A.5.1 Downstream Hazard Classification - High

A.5.2 Persons in Likely Floodpath - 10 (estimate)

A.5.3 Downstream Property - 2 homes and 1 large horse stable and track 4600 feet downstream.

A.5.4 Warning Systems - None

## STOTTS LAKE DAM

### APPENDIX A DATA SUMMARY

#### A.1 Dam

##### A.1.1 Type - Earthfill

##### A.1.2 Dimensions and Elevations

- a. Crest length - 422 feet
- b. Crest width - 7 feet
- c. Height - 17 feet
- d. Crest elevation (low point) - 388.9 feet msl
- e. Upstream slope - 1.2H:1V (potential for error is great due to extensive sloughing)
- f. Downstream slope - 1.6H:1V
- g. Size classification - Small

A.1.3 Zones, Cutoffs, Grout Curtains - There is no readily available means of confirming cutoff trench construction. No engineering supervision was provided during construction and the owner has no recollection or records of the work performed, but because the SCS provided technical assistance, a cutoff trench would certainly have been recommended.

##### A.1.4 Instrumentation - None

#### A.2 Reservoir and Drainage Area

##### a. Normal Pool

- 1) Elevation - 387 feet msl
- 2) Surface area - 6.6 acres
- 3) Storage capacity - 40 acre-feet
- 4) Reservoir length - 730 feet

##### b. Maximum Pool (designated top of dam)

- 1) Elevation - 388.9 feet msl
- 2) Surface area - 8 acres
- 3) Total capacity - 54 acre-feet

##### A.2.2 Drainage Area

- a. Size - 41 acres ( $0.064 \text{ mi}^2$ )
- b. Average ground slope - Approximately 5.6%
- c. Soils - Memphis (60%), Grenada (25%), Loring (15%)

d. Land use - Pasture (64%), wooded (18%),  
water (16%), residential or  
hard surface (2%)

e. Runoff (AMC II)

- 1) PMF - 25.3 inches
- 2)  $\frac{1}{2}$  PMF - 12.6 inches
- 3) 100 year - 2.6 inches

#### A.3 Outlet Structures

##### A.3.1 Service Spillway

- a. Type - Open channel parabolic
- b. Size - T = 30 feet  
 $H_d = 1.9$  feet
- c. Crest elevation - 387 feet msl
- d. Maximum capacity - 150 cfs (HEC-1 inter-  
polates 161 cfs)

A.3.2 Emergency Spillway - Service/emergency  
combination (see above)

#### A.4 Historical Data

A.4.1 Construction Date - 1951

A.4.2 Design - SCS technical assistance

A.4.3 Builder - Farm labor and equipment were used

A.4.4 Owner - Cedar Hill Farms (T. G. Barbee  
and Tolly Murff are principal or sole shareholders)

A.4.5 Previous Inspections - None. Dam was not  
previously on state or federal inventory.

A.4.6 Seismic Zone - 3

#### A.5 Downstream Hazard Data

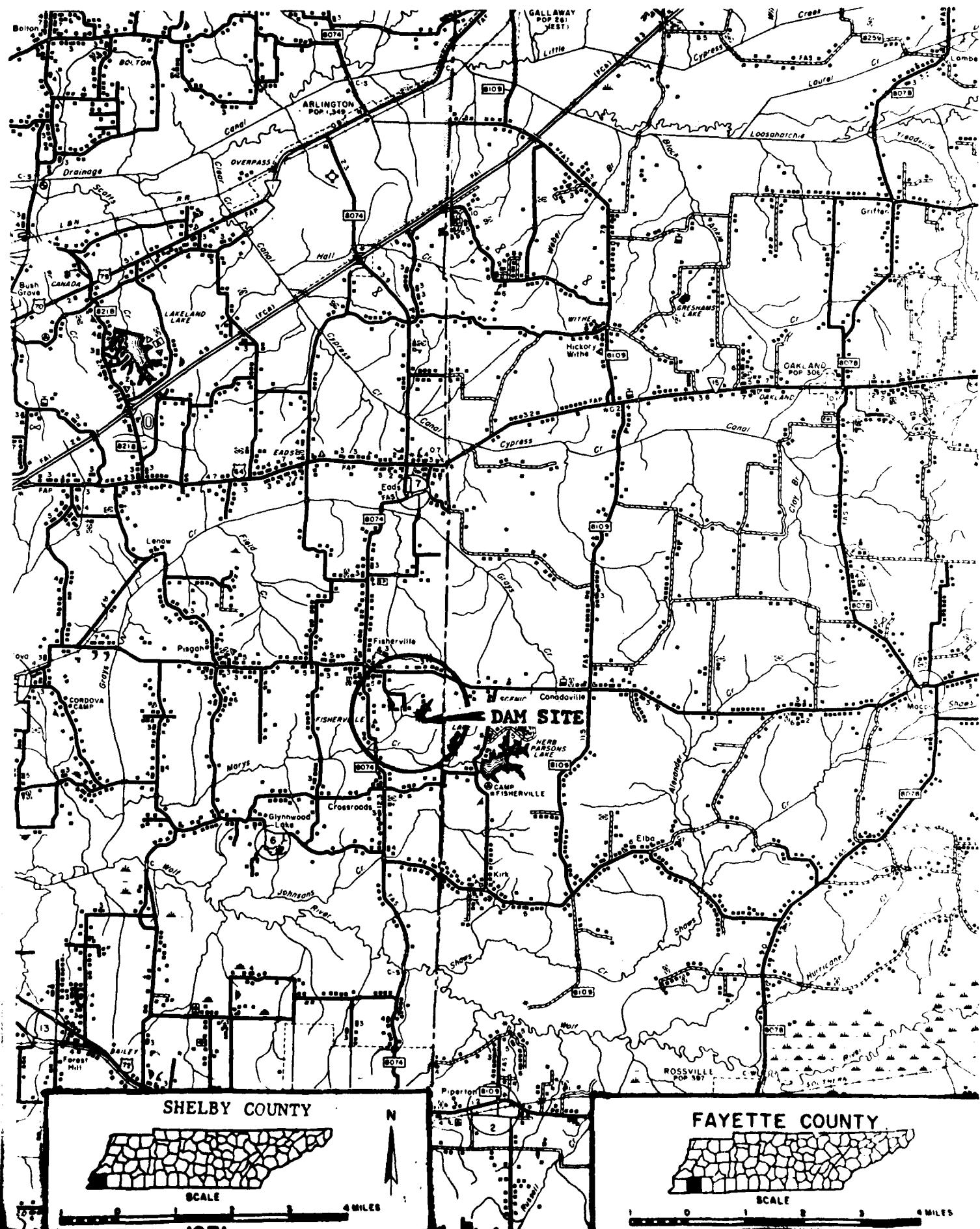
A.5.1 Downstream Hazard Classification - High

A.5.2 Persons in Likely Flood Path - 10 (est.)

A.5.3 Downstream Property - 2 homes, 1 horse stable  
and track approximately 7,600 feet downstream

A.5.4 Warning System - None

**APPENDIX B**  
**SKETCHES AND LOCATION MAPS**



U S DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

**WORK PLAN**  
**MARYS CREEK PILOT WATERSHED**  
**A PORTION OF**  
**FAYETTE AND SHELBY COUNTIES**  
**SOIL CONSERVATION DISTRICTS**  
**TENNESSEE**

JANUARY 1954

1 MILE  
0

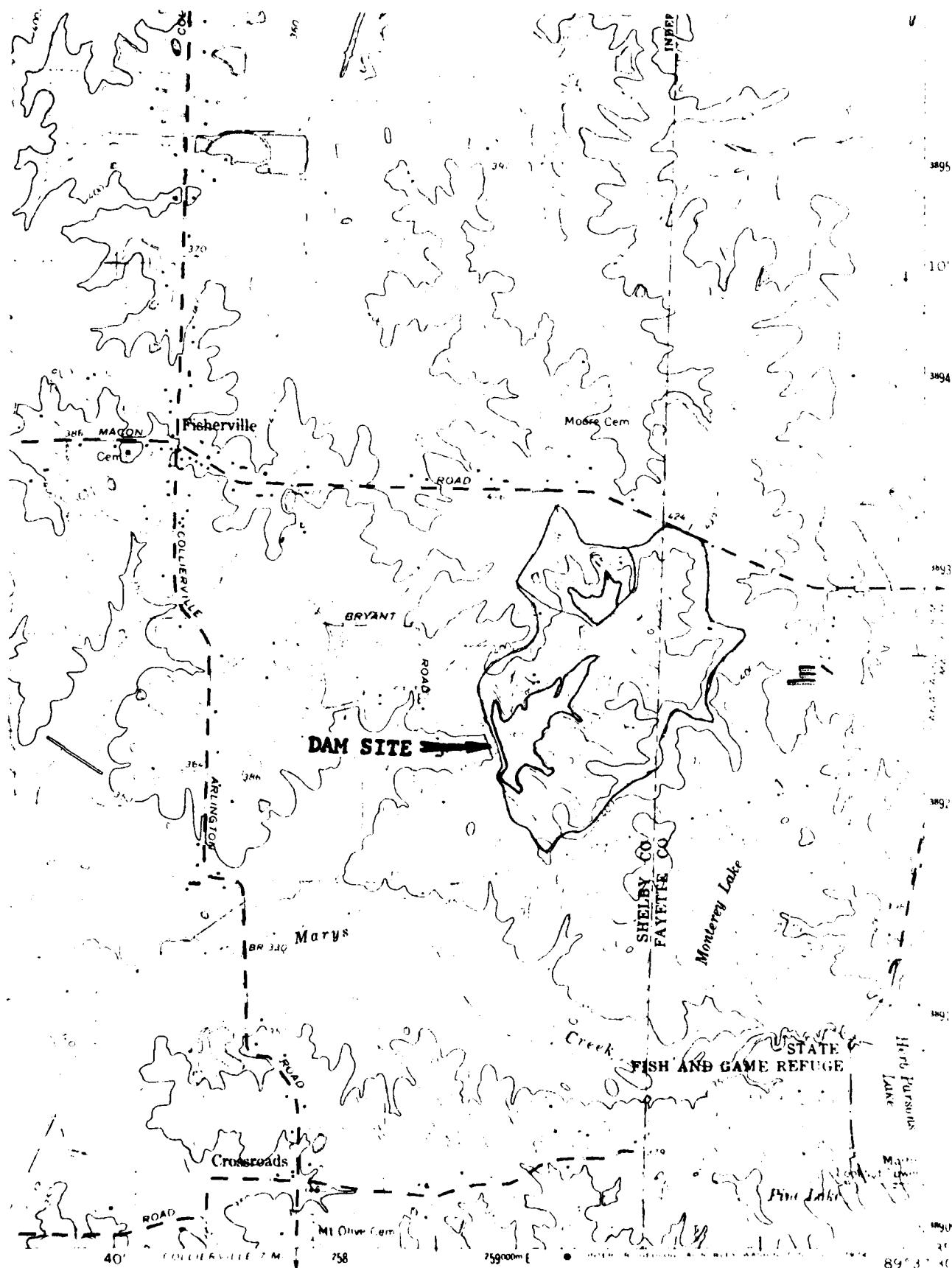
**LEGEND**

- PAVED ROADS
- UNPAVED ROADS
- DRAINAGE
- WATERSHED BOUNDARY
- EXISTING POND OR RESERVOIR
- DETENTION STRUCTURE
- DRAINAGE AREA BOUNDARY - SPECIAL STRUCTURES
- ACRES DRAINAGE AREA
- FLOOD PLAIN BOUNDARY
- STABILIZING AND SEDIMENT CONTROL MEASURE
- STREAM CHANNEL IMPROVEMENT

LOCATION MAP

Map showing the location of the Marys Creek Pilot Watershed in Fayette and Shelby Counties, Tennessee.

2-0-8550-2

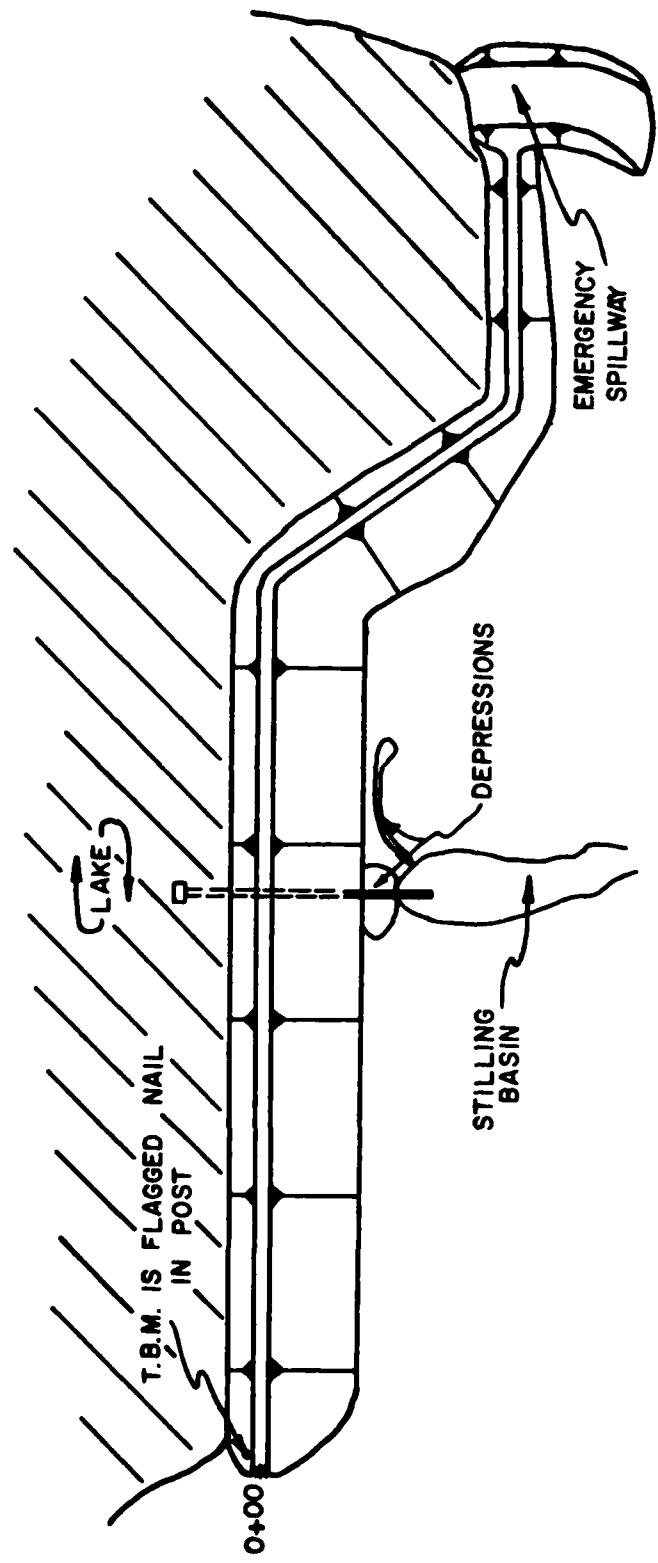


1 MILE

Environ Biol Fish (2007)

FIGURE 10.

EADS QUADRANGLE  
10' CONTOUR INTERVAL  
416 NW  
PHOTO REVISED 1973

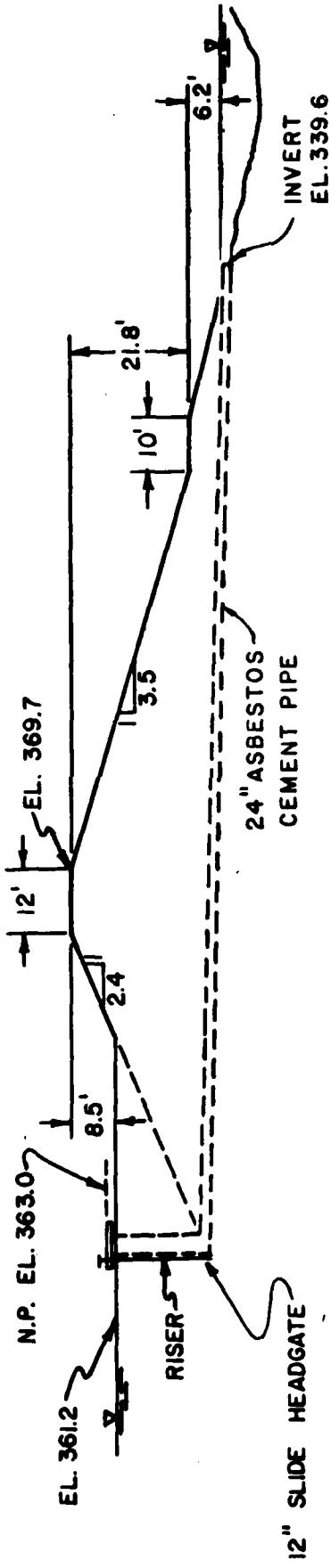


GENERAL PLAN  
N.T.S.

MARYS CREEK DAM  
# 8

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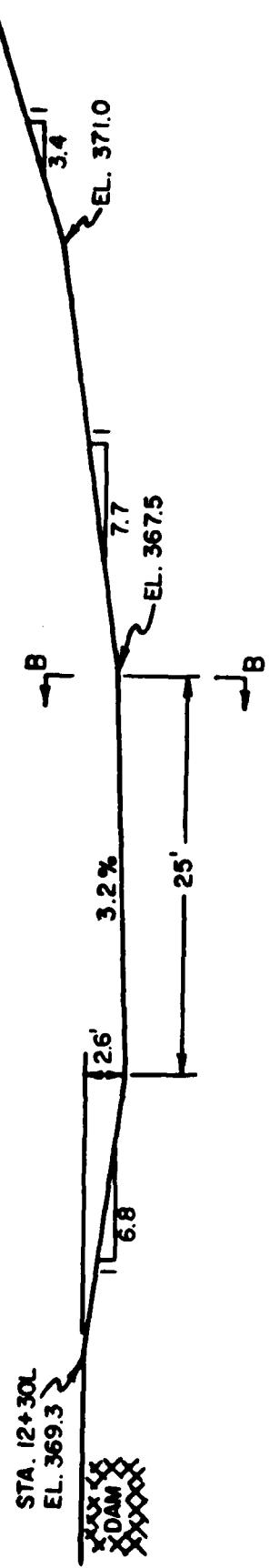
DRAWN BY: G.A.D.  
DATE: 5/4/81  
SHEET: 1 OF 5



MAXIMUM SECTION @ STA. 5+00L

NOTE: ELEVS. REFERENCED TO  
N.P. AS GIVEN ON U.S.G.S.  
TOPOGRAPHIC MAP.

MARYS CREEK DAM # 8	DRAWN BY: G.A.D.
DATE: 5/4/81	SHEET: 2 OF 5



EMERGENCY SPILLWAY CONTROL SECTION A-A  
SCALE: 1" = 10'

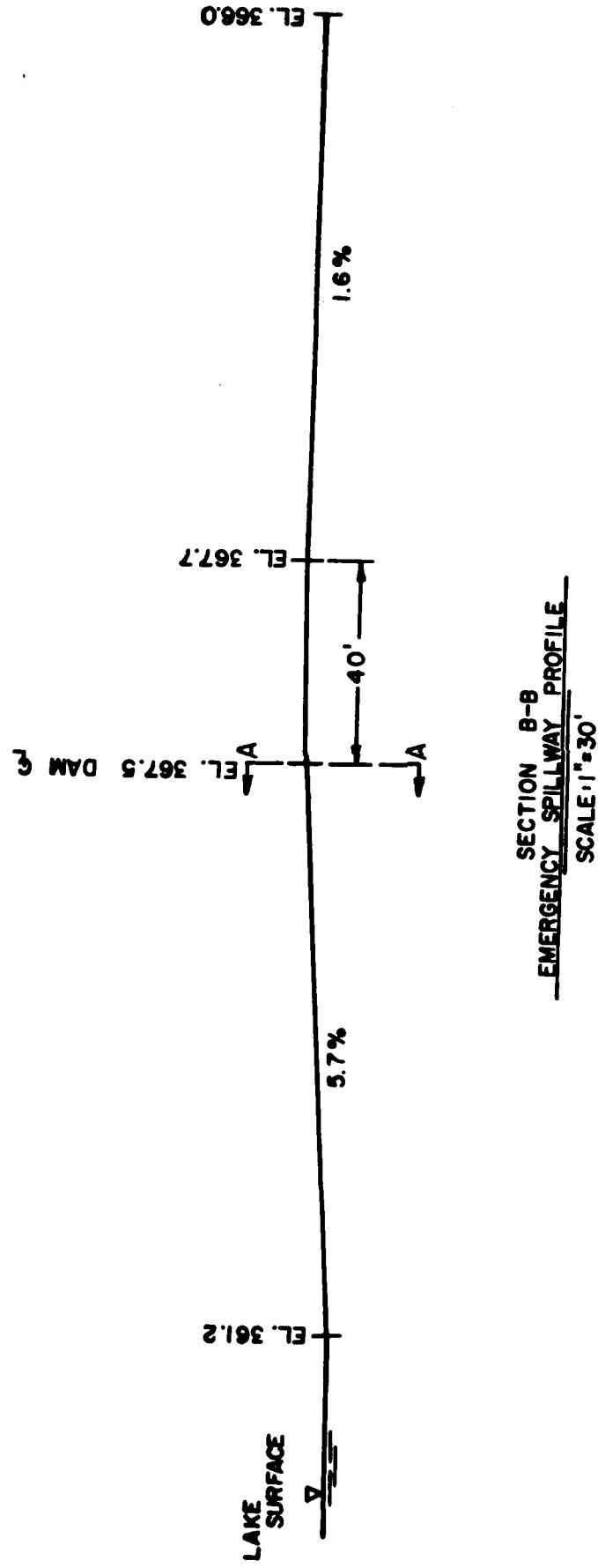
MARY'S CREEK DAM # 8	DRAWN BY: G.A.D
	DATE: 4/30/81
	SHEET: 3 OF 5

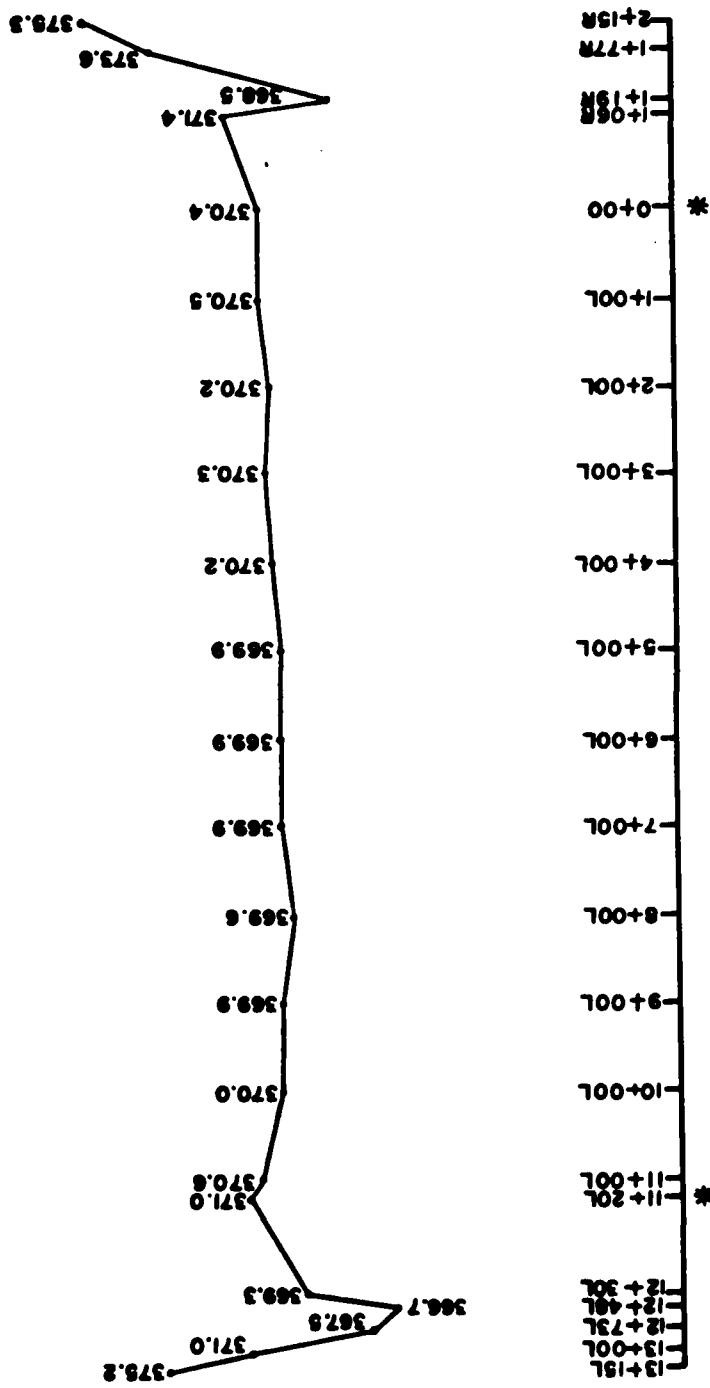
MARYS CREEK DAM  
#8

DRAWN BY: G.A.D.

DATE: 4/30/81

SHEET: 4 OF 5



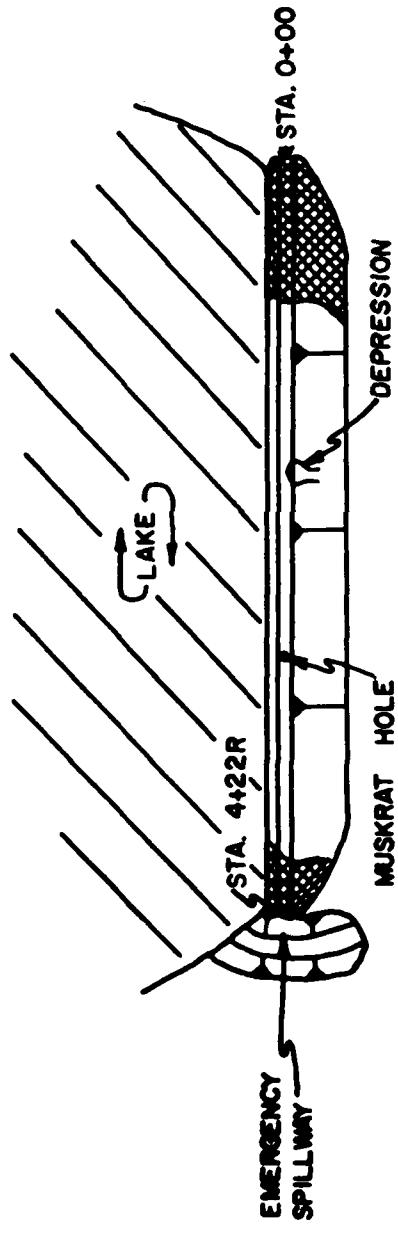


**CREST E PROFILE**  
**H. SCALE: I = 200'**  
**V. SCALE: I = 5'**

H. SCALE: 1" = 200'  
V. SCALE: 1" = 5'

\*END OF DAM

DRAWN BY : G.A.D.  
DATE : 5/4/81  
SHEET : 5 OF 5



NOTE: - NEW FILL MATERIAL

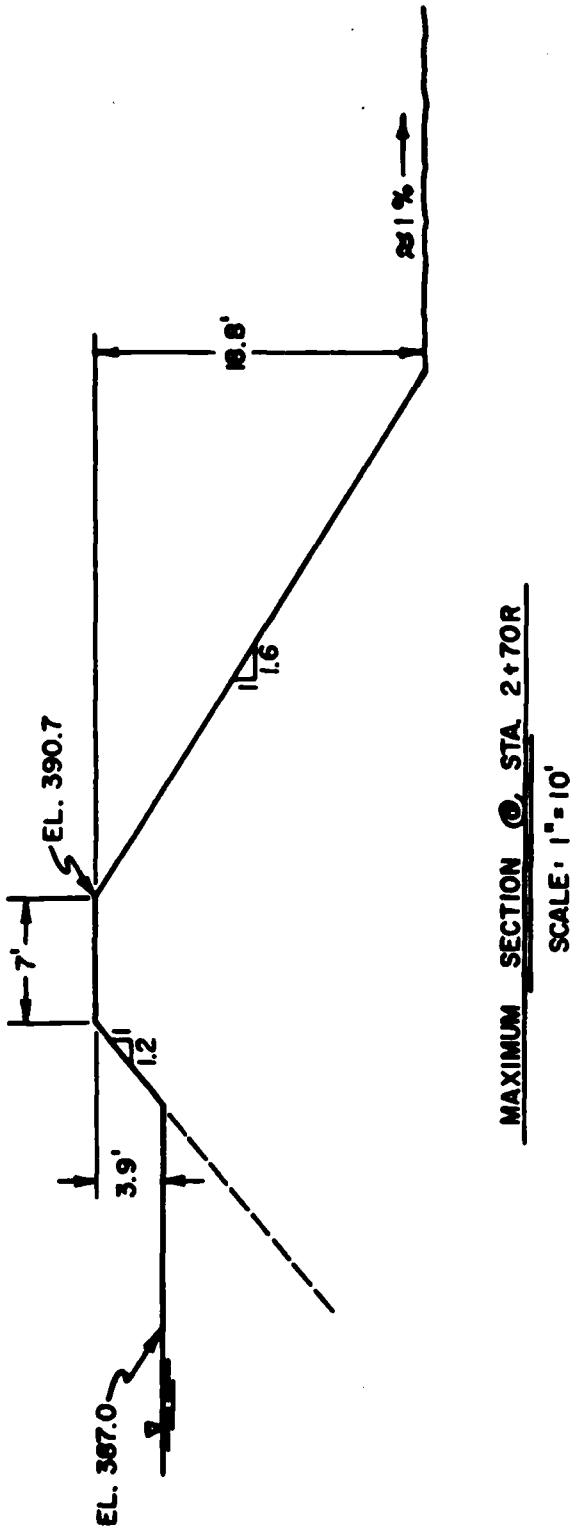
GENERAL PLAN  
SCALE: 1" = 100'

STOTTS LAKE  
DAM

DRAWN BY, G.A.D.

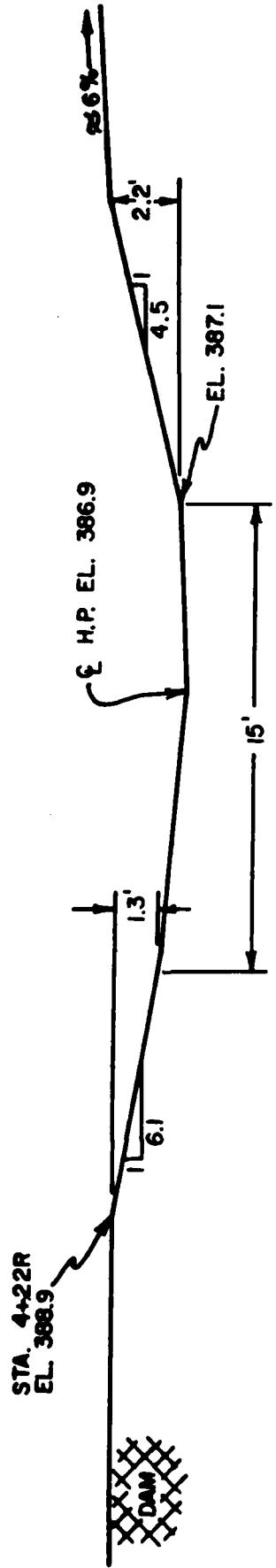
DATE, 5/19/81

SHEET: 1 OF 5



NOTE: ELEVS. REFERENCED TO  
APPROX. LAKE SURFACE EL.  
387 AS SHOWN ON USGS  
QUADRANGLE MAP.

STOTTS LAKE DAW	DRAWN BY: G.A.D.
	DATE: 5/19/81
	SHEET 2 OF 5



EMERGENCY SPILLWAY CONTROL SECTION

STOTTS LAKE DAM.	DRAWN BY G.A.D.
	DATE: 5/20/81
	SHEET: 3 OF 5

EL. 385.3

EL. 384.8

EL. 386.9 (HIGH POINT)

EL. 387.0

DAM 6

4%

2%

25'

EMERGENCY SPILLWAY PROFILE  
SCALE: 1" = 20'

STOTTS LAKE  
DAM

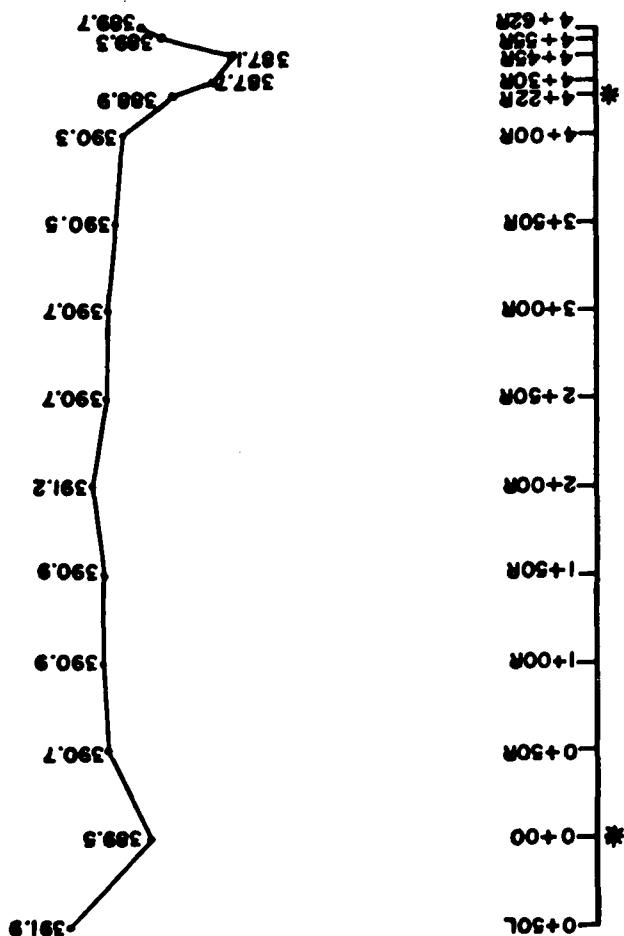
DRAWN BY: G.A.D.

DATE: 5/20/81

SHEET: 4 OF 5

**STOTTS LAKE  
DAM**

DRAWN BY: G.A.D.  
DATE: 5/20/81  
SHEET - 5 OF 5



\*END OF DAM

CREST E PROFILE  
H. SCALE: 1" = 100'  
V. SCALE: 1" = 5'

**APPENDIX C**  
**PHOTOGRAPHIC RECORD**

Mary's Creek No. 8

Photographic Record

Photo No. 1 - Aerial shot.

Photo No. 2 - Aerial shot showing Stotts Lake Dam upstream of Mary's Creek.

Photo No. 3 - Aerial shot looking downstream.

Photo No. 4 - Aerial shot looking upstream.

Photo No. 5 - Downstream slope of dam from left.

Photo No. 6 - Downstream slope and curvilinear portion of dam.

Photo No. 7 - Riser.

Photo No. 8 - Downstream of toe showing excavated drainage ditch.

Photo No. 9 - Sloughing along upstream slope just right of emergency spillway.

Photo No. 10 - Sloughing along entrance channel of emergency spillway.

Photo No. 11 - Stilling basin from crest.

Photo No. 12 - Downstream channel.

Photo No. 13 - Stilling basin from downstream.

Photo No. 14 - Stilling basin.

Photo Nos. 15 & 16 - Pooled water in downstream section of drainage ditch shown in Photo No. 8.

Photo No. 17 - Entrance channel of emergency spillway.

Photo No. 18 - Exit channel of spillway.



PHOTO NO. 1



PHOTO NO. 2



PHOTO NO. 3



PHOTO NO. 4



PHOTO NO.5

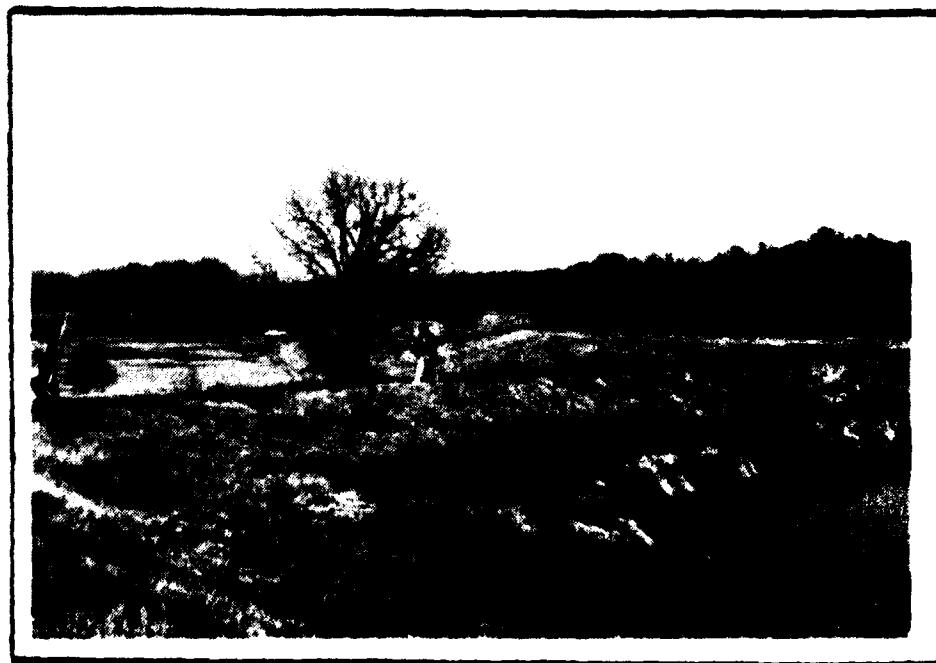


PHOTO NO.6

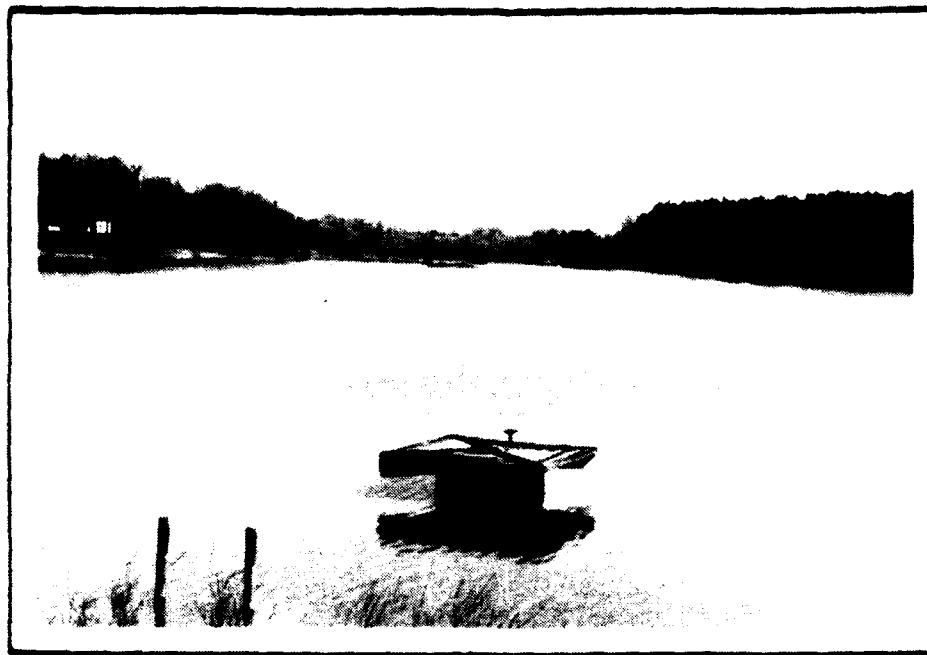


PHOTO NO. 7



PHOTO NO. 8



PHOTO NO. 9



PHOTO NO. 10



PHOTO NO. 11



PHOTO NO. 12



PHOTO NO.13



PHOTO NO.14



PHOTO NO. 15

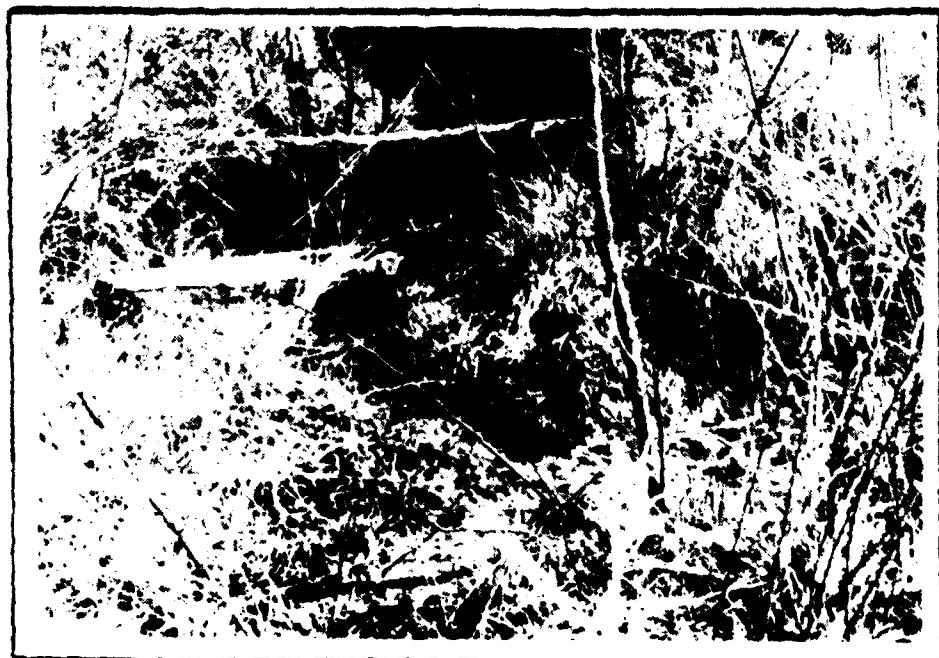


PHOTO NO. 16



PHOTO NO .17



PHOTO NO .18

Stotts Lake Dam

Photographic Log

Photo No. 1 - Downstream slope at left end of dam showing new fill material.

Photo No. 2 - Downstream slope looking left from mid-section.

Photo No. 3 - Downstream slope from emergency spillway exit channel.

Photo No. 4 - Crest of dam looking right from near mid-section.

Photo No. 5 - Upstream slope of dam showing extensive sloughing.

Photo No. 6 - Upstream slope at left end of dam.

Photo No. 7 - Depression on downstream side of crest.

Photo No. 8 - Muskrat hole on crest.

Photo No. 9 - Sloughing along upstream slope (turned 90°).

Photo No. 10 - Longitudinal surface crack along upstream slope of new fill material at left end of dam.

Photo No. 11 - Spillway, from right of dam.

Photo No. 12 - Spillway, looking upstream.

Photo No. 13 - Eroded area along spillway channel approximately 150 feet downstream of dam.



PHOTO NO. 1



PHOTO NO. 2



PHOTO NO. 3



PHOTO NO. 4



PHOTO NO. 5



PHOTO NO. 6



PHOTO NO. 7



PHOTO NO. 8



PHOTO NO. 9



PHOTO NO. 10

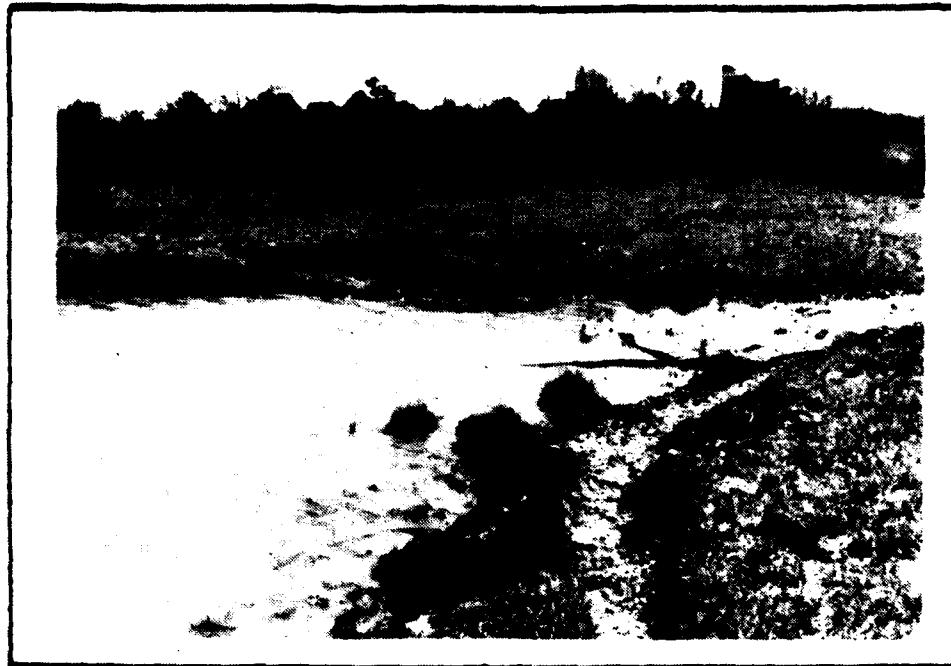


PHOTO NO. 11



PHOTO NO. 12



PHOTO NO. 13

APPENDIX D

TECHNICAL CRITIQUE  
CHECKLISTS FOR VISUAL INSPECTION  
ENGINEERING DATA  
SOIL TESTS

Check List  
Visual Inspection of Earth Dams  
Department of Conservation  
Division of Water Resources

Name of Dam Mary's Creek Lake Dam No. 8

County Shelby Date of Inspection March 11, 1981

ID # - State 79-7027 Federal TN 15727

Type of Dam Earth

Hazard Category-Federal 1 State High

Weather Sunny Temperature 70° F

Pool at Time of Inspection Normal Pool (distance from crest)  
at top

of pipe (distance from stream bed)

Design/As Built Drawings Available: Yes X No       

Location: SCS - Nashville

Copy Obtained: Yes X No       

Reviewed: Yes X No       

Construction History Available: Yes        No X

Location:       

Copy Obtained: Yes        No       

Reviewed: Yes        No       

Other Records and Reports Available: Yes X No       

Location: Watershed Work Plan - TDWR & SCS Regional Office, Nashville

Copy Obtained: Yes X No       

Reviewed: Yes X No       

Prior Incidents or Failures: Yes        No X

Inspection Personnel and Affiliation:

Ed O'Neill - TDWR

George Moore - TDWR

William Culbert - TDWR

I. Embankment

A. Crest

Description (1st inspection) Relatively flat, rounded upstream and downstream edges. Good Bermuda grass cover.

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1. Longitudinal Alignment Straight over most of its length. Curved near emergency spillway.

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2. Longitudinal Surface Cracks None

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3. Transverse Surface Cracks None

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4. General Condition of Surface Good

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5. Miscellaneous \_\_\_\_\_

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B. Upstream Slope

1. Undesirable Growth or Debris None

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2. Sloughing, Subsidence, or Depressions Appreciable  
erosion. Rilling and gully formation over much  
of length.

3. Slope Protection Bermuda grass only.

a. Condition of Riprap N/A

b. Durability of Individual Stones N/A

c. Adequacy of Slope Protection Against Waves  
and Runoff Inadequate. Will need riprap  
within next year or two.

d. Gradation of Slope Protection - Localized Areas  
of Fine Material N/A

4. Surface Cracks None

C. Downstream Slope

1. Undesirable Growth or Debris Large bush and small  
evergreen near middle toe of dam.

2. Sloughing, Subsidence, or Depressions; Abnormal Bulges or Non-Uniformity Some scattered small depressions.  
May be dispersive soil. Appear inactive.

3. Surface Cracks on Face of Slope None

4. Surface Cracks or Evidence of Heaving at Embankment Toe None

5. Wet or Saturated Areas or Other Evidence of Seepage on Face of Slope; Evidence of "Piping" or "Boils"  
None

6. Drainage System 6" toe drain - submerged

7. Fill Contact with Outlet Structure Cannot be ascertained because outlet is submerged

8. Condition of Grass Slope Protection Reasonably full and uniform. Bermuda grass.

D. Abutments

1. Erosion or Contact of Embankment with Abutment from Surface Water Runoff, Upstream or Downstream \_\_\_\_\_  
Nothing significant

2. Springs or Indications of Seepage Along Contact of Embankment with the Abutments None

3. Springs or Indications of Seepage in Areas a Short Distance Downstream of Embankment - Abutment Tie-in  
None

## **II. Area Downstream of Embankment, Including Channel**

**A. Localized Subsidence, Depressions, Sinkholes, Etc.** 100 square feet depressed area 100' left of the principal spillway. Base of depression is moist. It tapers to a shallow gully and extends D/S, intersecting the principal spillway exit channel. 35' D/S of dam, depressed area breaks into hole with standing water. No observable flow.

**B. Evidence of "Piping", "Boils", or "Seepage"** \_\_\_\_\_  
None besides that previously mentioned.

**C. Unusual Presence of Lush Growth, such as Swamp Grass, etc.** \_\_\_\_\_  
None

**D. Unusual Muddy Water in Downstream Channel** Relatively muddy because there is no flow and cows drink there.

**E. Sloughing or Erosion** Some minor sloughing initiated by cattle traffic.

**F. Surface Cracks or Evidence of Heaving Beyond Embankment Toe** None

**G. Stability of Channel Sideslopes** Good. Relatively steep.

**H. Condition of Channel Slope Protection** Good. Natural cover.

I. Adequacy of Slope Protection Against Waves, Currents,  
and Surface Runoff Adequate

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J. Miscellaneous Mud blocks stilling basin. Pipe and especially  
embankment drains should not be submerged. Could cause build  
up of methane gas in embankment.

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K. Condition of Relief Wells, Drains, and Other  
Appurtenances N/A

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L. Unusual Increase or Decrease in Discharge from  
Relief Wells N/A

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### **III. Instrumentation**

**A. Monumentation/Surveys** \_\_\_\_\_ N/A

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**B. Observation Wells** \_\_\_\_\_ N/A

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**C. Weirs** \_\_\_\_\_ N/A

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**D. Piezometers** \_\_\_\_\_ N/A

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**E. Other** \_\_\_\_\_

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IV. Spillways

A. Service Spillway (Service/Emergency Combination Yes    No X)

1. Intake Structure Condition Good (observed from dam). Timbers are noticeably weathered.
2. Outlet Structure Condition No structure - outlet submerged.
3. Pipe Condition Submerged in impact basin.
4. Evidence of Leakage or Piping None
5. General Remarks Pipe is apparently not laid according to specifications. Outlet is approximately 4 feet below design location.

B. Emergency Spillway

1. General Condition Good. Uniform and well grassed. Some noteable erosion along upstream left side slope.
2. Entrance Channel Some appreciable sloughing near water surface. Rest is uniform and well grassed. Fence across entrance channel.
3. Control Section Same as general condition. Best grass cover.

3. Exit Channel Same as general condition.

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4. Vegetative/Woody Cover Grass only.

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5. Other Observations \_\_\_\_\_

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V. Emergency Drawdown Facilities (if part of service spillway so state), Valve stem visable at riser. Doesn't work. Always leaked so clay was dumped over inlet.

---

Are Facilities Operable: Yes \_\_\_\_\_ No X

Were Facilities Operated During Inspection: Yes \_\_\_\_\_ No X

Date Facilities Were Last Used Soon after dam was built

VI. Reservoir

A. Slopes Some erosion around entire reservoir.

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B. Sedimentation Moderate to high.

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C. Turbidity Low to moderate.

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VII. Drainage Area

Description (for hydrologic analysis) Mostly  
pasture and woodland.

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A. Changes in Land Use None

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VIII. Downstream Area (Stream)

A. Condition (obstructions, debris, etc.) 2 houses and  
several farm buildings 4600 feet downstream.

B. Slopes 0.5% channel slope

C. Approximate No. Homes, Population, and Distance D/S

2 houses 4600 feet downstream.

D. Other Hazards Horse stables and track some distance  
downstream.

## IX. Miscellaneous

Incidents/Failures No incidents reported by owner.

Observed Geology of Area Loess soils (wind blown) covers most of area.

## X. Conclusions

- 1) The dam is uniform and well grassed.
- 2) A few areas of significant erosion were observed on the upstream slope of the dam and downstream of the toe.
- 3) There was no measurable seepage found.

## XI. Recommendations

- 1) Monitor depressions on downstream slope for development of flow.
- 2) Riprap upstream slope, particularly in area of extreme sloughing.
- 3) Develop an emergency action plan for alerting downstream residents in the event that failure appears imminent.

  
William H. Gandy  
Regional Engineer

  
Chief Engineer

**OHIO RIVER DIVISION, NASHVILLE DISTRICT  
SOIL TEST DATA SUMMARY**

PROJECT MARYS CREEK NO.8 HOLE 1 ELEV. TOP SHEET 1 OF 1 SHEETS

ORN 344  
SEPT 67

ORNLFD-D

Check List  
Visual Inspection of Earth Dams  
Department of Conservation  
Division of Water Resources

Name of Dam Stotts (Tolly Murff)  
County Shelby Date of Inspection April 1, 1981  
ID # - State 79-7078 Federal TN 15776  
Type of Dam Earth  
Hazard Category-Federal 1 State High  
Weather Sunny, breezy At Normal Pool Temperature 70° F  
Pool at Time of Inspection spillway crest (distance from crest)  
Tailwater at Time of Inspection app 1/10 (distance from stream bed)  
Design/As Built Drawings Available: Yes X No \_\_\_\_\_  
Location: SCS Regional Office, Nashville and TDWR  
Copy Obtained: Yes X No \_\_\_\_\_  
Reviewed: Yes X No \_\_\_\_\_  
Construction History Available: Yes \_\_\_\_\_ No X  
Location: \_\_\_\_\_  
Copy Obtained: Yes \_\_\_\_\_ No \_\_\_\_\_  
Reviewed: Yes \_\_\_\_\_ No \_\_\_\_\_  
Other Records and Reports Available: Yes X No \_\_\_\_\_  
Location: Watershed Work Plan - SCS Regional Office and TDWR  
Copy Obtained: Yes X No \_\_\_\_\_  
Reviewed: Yes X No \_\_\_\_\_  
Prior Incidents or Failures: Yes \_\_\_\_\_ No X  
Inspection Personnel and Affiliation:  
George Moore - TDWR  
Bill Culbert - TDWR  
Gene Davis - TDWR  
David Roe - TDWR

## I. Embankment

### A. Crest

Description (1st inspection) Adequate grass cover.

Relatively flat and uniform. Sloughing from upstream slope extends well into crest. Dam has new fill on both ends. No grass cover or new embankment. Deep animal burrows near mid-section. 2' deep gully/depression begins approximately in middle of crest extending 5-10' downstream. Some minor remnants of it all the way to toe.

1. Longitudinal Alignment Straight
2. Longitudinal Surface Cracks New fill at left side of dam has crack running its entire length. Apparently the water has weakened the upstream slope to the point that major sloughing would be inevitable with any appreciable wave action.
3. Transverse Surface Cracks None
4. General Condition of Surface Poor
5. Miscellaneous \_\_\_\_\_

### B. Upstream Slope

1. Undesirable Growth or Debris One small woody bush.

2. Sloughing, Subsidence, or Depressions Severe sloughing over entire length from water surface well into crest.

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3. Slope Protection None. Some patches of grass where slope remains, but virtually all of the surface has sloughed off.

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a. Condition of Riprap N/A

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b. Durability of Individual Stones N/A

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c. Adequacy of Slope Protection Against Waves  
and Runoff Poor

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---

d. Gradation of Slope Protection - Localized Areas  
of Fine Material N/A

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4. Surface Cracks New fill of left side of dam has surface crack near junction of upstream slope and crest. Runs onto upstream slope as it mates with old embankment material.

---

C. Downstream Slope

1. Undesirable Growth or Debris Only 1 tree, approximately 6" diameter, near toe right of center. Approximately 50 square yard area of woody bushes near center toe. Few others just downstream of right side of crest.

**2. Sloughing, Subsidence, or Depressions; Abnormal**

**Bulges or Non-Uniformity** No significant sloughing.  
Pervasive minor nonuniformity from cattle traffic, but  
no gullyling has been set up and surface is extensively  
grassed. Few small depressions along toe. One large  
shallow one around tree, but looks to have been created  
by cattle. No sign of seepage. (See crest)

**3. Surface Cracks on Face of Slope** \_\_\_\_\_

None

**4. Surface Cracks or Evidence of Heaving at**

**Embankment Toe** None

None

**6. Drainage System** None apparent.

**7. Fill Contact with Outlet Structure** N/A

**8. Condition of Grass Slope Protection** Good

D. Abutments

1. Erosion of Contact of Embankment with Abutment from Surface Water Runoff, Upstream or Downstream New embankment construction at both ends of dam. No significant erosion observed downstream along tie-ins. Good grass cover.

2. Springs or Indications of Seepage Along Contact of Embankment with the Abutments None

3. Springs or Indications of Seepage in Areas a Short Distance Downstream of Embankment - Abutment Tie-in

None

**II. Area Downstream of Embankment, Including Channel**

**A. Localized Subsidence, Depressions, Sinkholes, Etc.** \_\_\_\_\_

None

**B. Evidence of "Piping", "Boils", or "Seepage"** None

\_\_\_\_\_

\_\_\_\_\_

**C. Unusual Presence of Lush Growth, such as Swamp  
Grass, etc.** None

\_\_\_\_\_

\_\_\_\_\_

**D. Unusual Muddy Water in Downstream Channel** None

\_\_\_\_\_

\_\_\_\_\_

**E. Sloughing or Erosion** Nothing significant.

\_\_\_\_\_

\_\_\_\_\_

**F. Surface Cracks or Evidence of Heaving Beyond  
Embankment Toe** None

\_\_\_\_\_

\_\_\_\_\_

**G. Stability of Channel Sideslopes** Good. Practically

flat cross-section.

\_\_\_\_\_

\_\_\_\_\_

**H. Condition of Channel Slope Protection** Excellent grass

cover except on the left side of dam near critical section  
where embankment was refilled. No grass cover here.

I. Adequacy of Slope Protection Against Waves, Currents,  
and Surface Runoff \_\_\_\_\_ Good

\_\_\_\_\_

J. Miscellaneous \_\_\_\_\_

\_\_\_\_\_

K. Condition of Relief Wells, Drains, and Other  
Appurtenances \_\_\_\_\_ None

\_\_\_\_\_

L. Unusual Increase or Decrease in Discharge from  
Relief Wells \_\_\_\_\_ N/A

\_\_\_\_\_

### **III. Instrumentation**

A. Monumentation/Surveys \_\_\_\_\_ N/A  
\_\_\_\_\_  
\_\_\_\_\_

B. Observation Wells \_\_\_\_\_ N/A  
\_\_\_\_\_  
\_\_\_\_\_

C. Weirs \_\_\_\_\_ N/A  
\_\_\_\_\_  
\_\_\_\_\_

D. Piezometers \_\_\_\_\_ N/A  
\_\_\_\_\_  
\_\_\_\_\_

E. Other \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

#### IV. Spillways

##### A. Service Spillway (Service/Emergency Combination Yes X No   )

1. Intake Structure Condition See Emergency Spillway

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2. Outlet Structure Condition \_\_\_\_\_

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---

3. Pipe Condition \_\_\_\_\_

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---

4. Evidence of Leakage or Piping \_\_\_\_\_

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5. General Remarks \_\_\_\_\_

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##### B. Emergency Spillway

1. General Condition Good. Well grassed and uniform cross-section.

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2. Entrance Channel Submerged, practically non-existent. Control section occurs approximately along dam centerline.

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3. Control Section Same as general.

---

---

3. Exit Channel Same

4. Vegetative/Woody Cover Grass only. Adequate.

5. Other Observations Approximately 150 feet downstream the channel takes a 3 foot drop then widens appreciably.

V. Emergency Drawdown Facilities (if part of service spillway  
so state) \_\_\_\_\_

None

Are Facilities Operable: Yes \_\_\_\_\_ No \_\_\_\_\_

Were Facilities Operated During Inspection: Yes \_\_\_\_\_ No \_\_\_\_\_

Date Facilities Were Last Used \_\_\_\_\_

VI. Reservoir

A. Slopes Gradual

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B. Sedimentation Assumed moderate to high

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C. Turbidity High

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VII. Drainage Area

Description (for hydrologic analysis) Predominantly  
active pasture land.

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A. Changes in Land Use None expected.

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VIII. Downstream Area (Stream)

A. Condition (obstructions, debris, etc.) Nothing significant

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B. Slopes 0.7% (immediately upstream of Mary's Creek Dam  
No. 8 reservoir)

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C. Approximate No. Homes, Population, and Distance D/S  
2 homes and horse stables approximately 8100 feet  
downstream.

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D. Other Hazards

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## IX. Miscellaneous

Incidents/Failures None reported by owner.

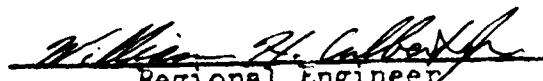
Observed Geology of Area Predominantly Loess soil.

## X. Conclusions

- 1) The dam is uniform and well grassed with some undesirable vegetation.
- 2) The upstream slope has undergone considerable sloughing extending well into the crest.
- 3) No signs of seepage were observed.

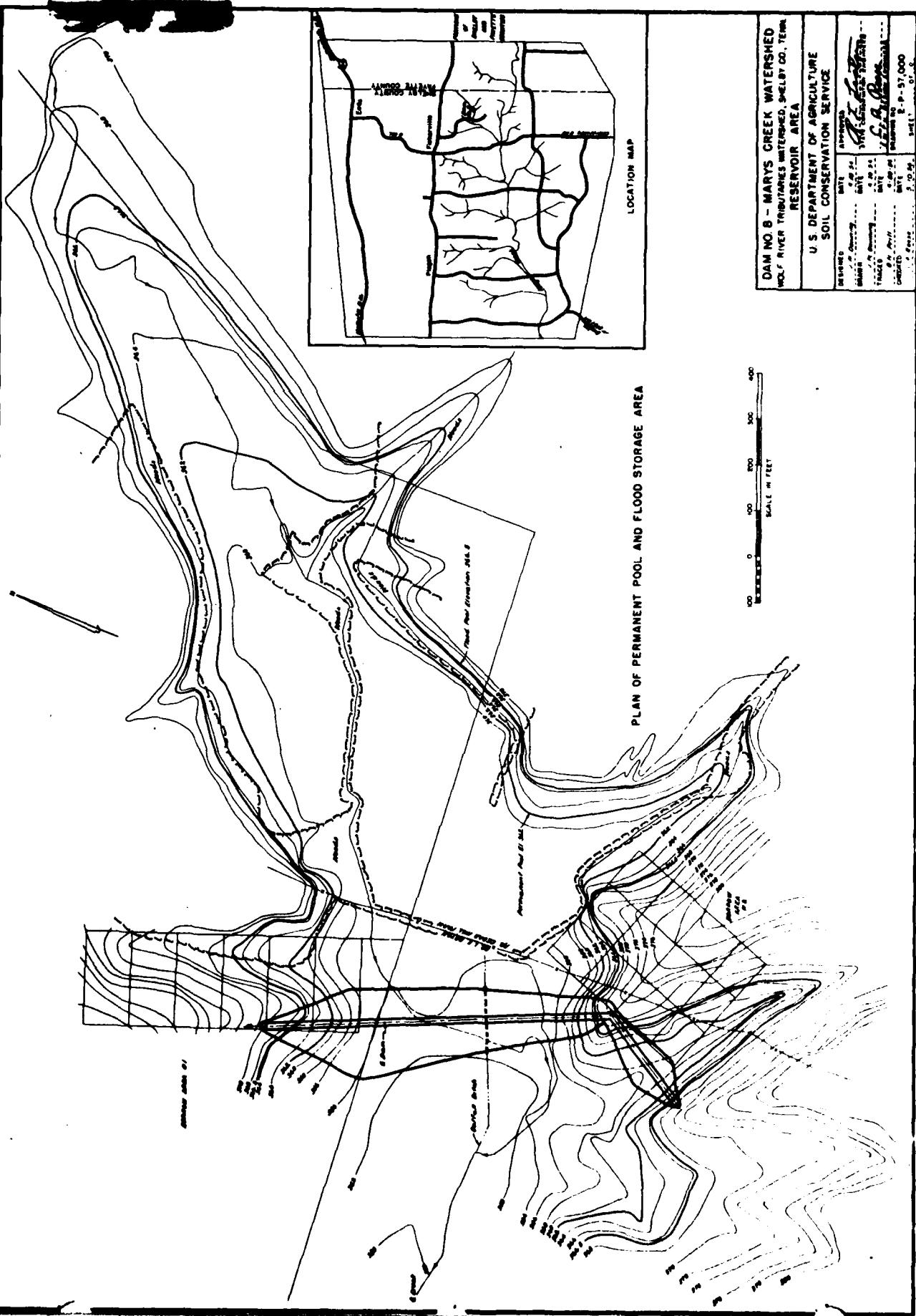
## XI. Recommendations

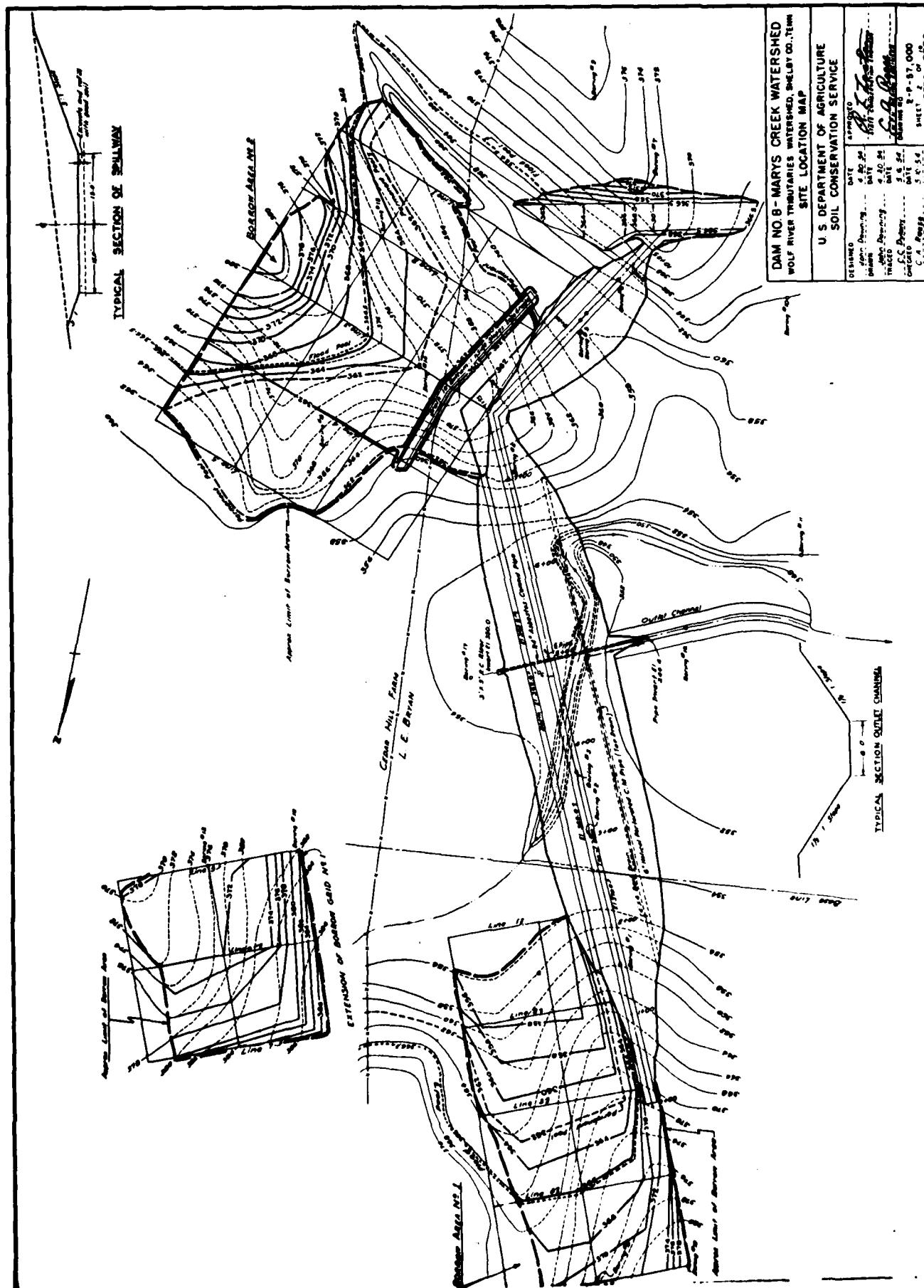
- 1) Provide some protection for the upstream slope of the dam.
- 2) Remove the tree and bushes from the downstream slope.
- 3) Prevent cattle from walking on the dam.
- 4) Develop an emergency action plan for alerting downstream residents in the event that failure appears imminent.

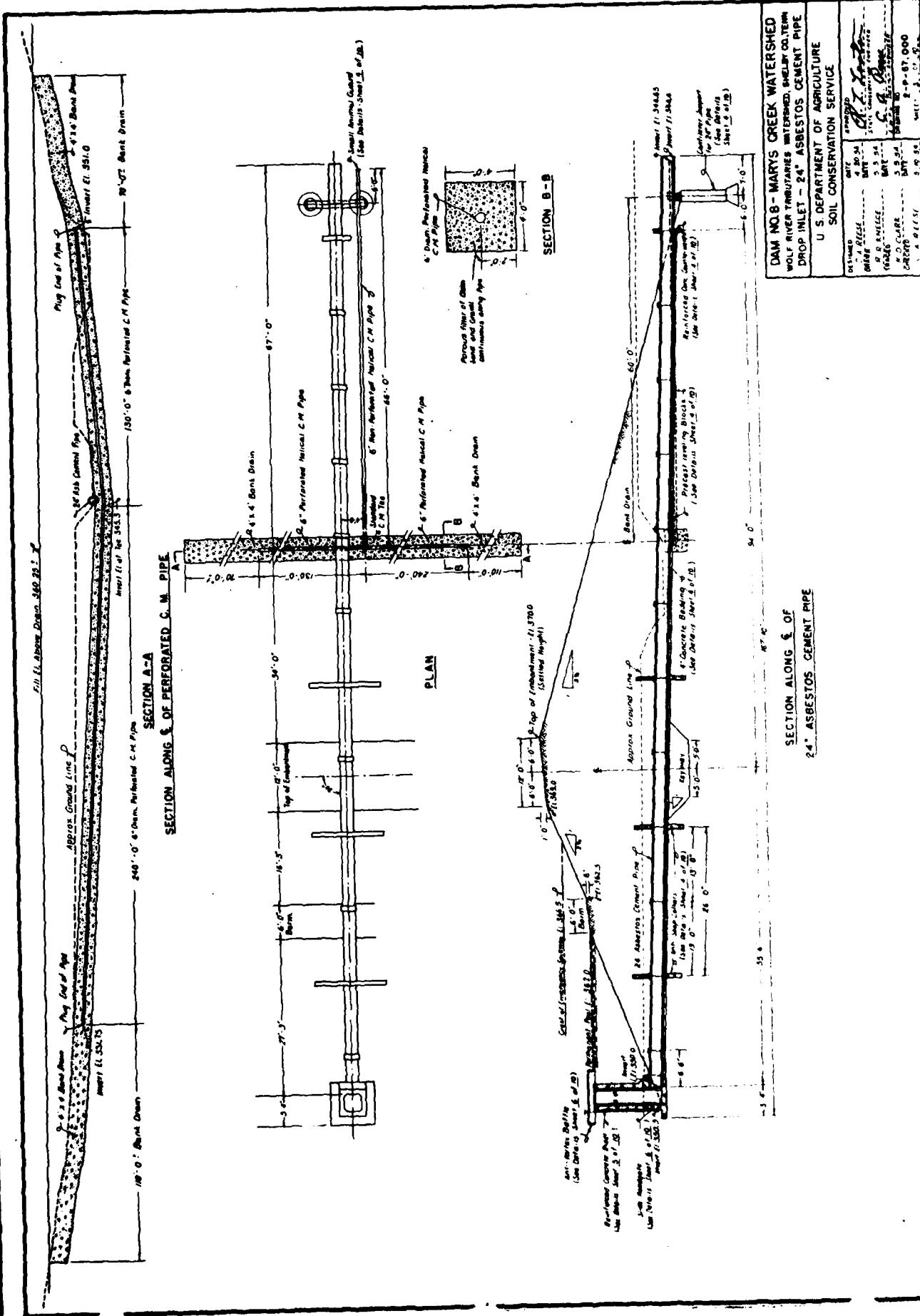
  
William H. Collier, Jr.  
Regional Engineer

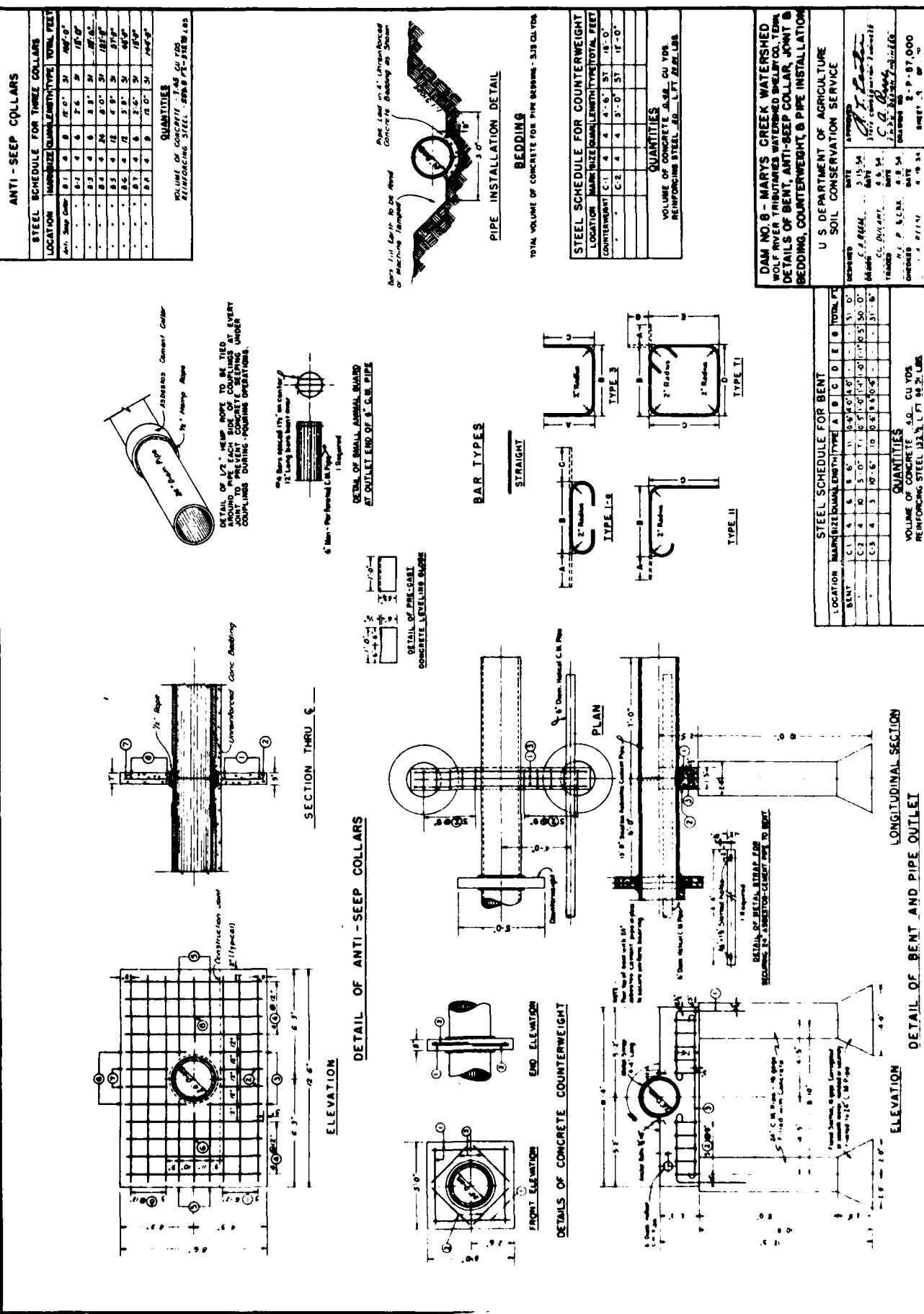
Chief Engineer

**APPENDIX E**  
**DESIGN DRAWINGS**











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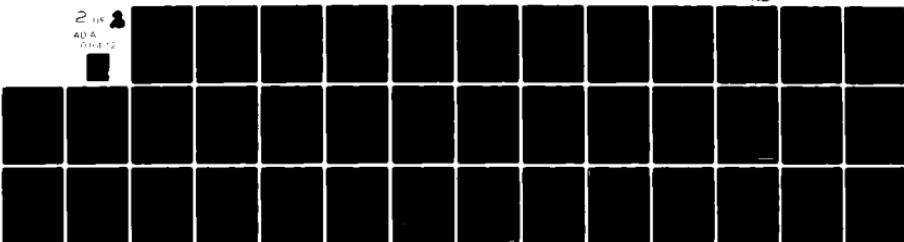
TENNESSEE STATE DEPT OF CONSERVATION NASHVILLE DIV 0--ETC F/G 13/13  
NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE. --ETC(U)  
SEP 81 W CULBERT

DACW62-81-C-0056

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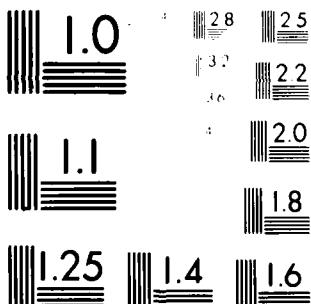
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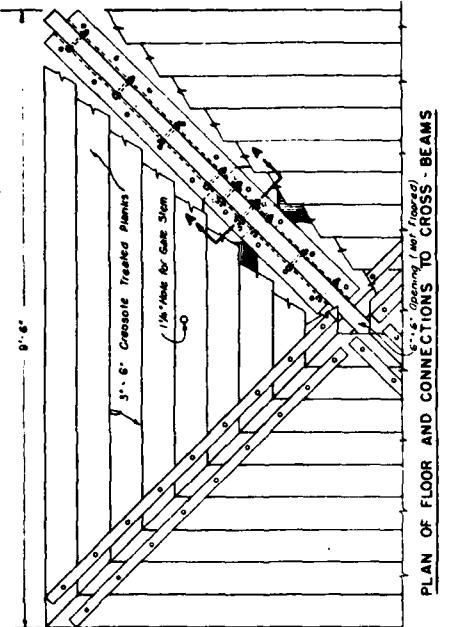


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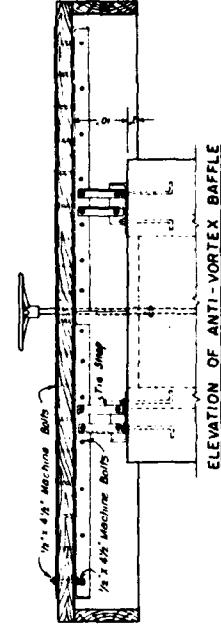
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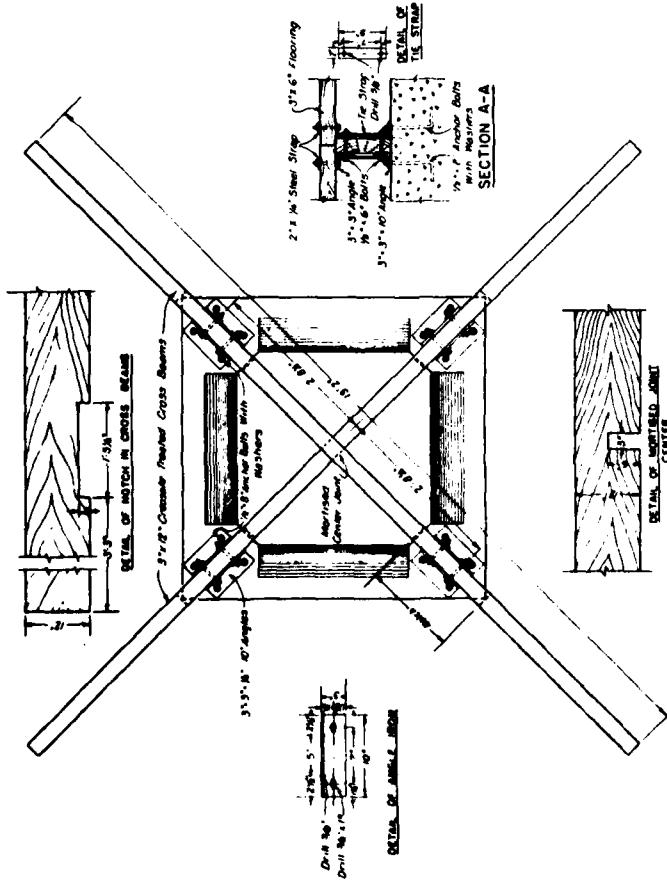
MICROGRAPHIC RESOLUTION TEST CHART



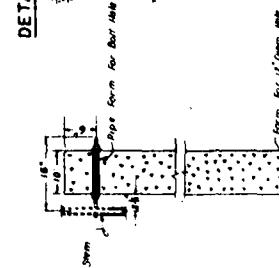
**PLAN OF FLOOR AND CONNECTIONS TO CROSS - BEAMS**



## ELEVATION OF ANTI-VORTEX BAFFLE



PLAN OF CROSS - BEAMS AND CONNECTIONS TO RISER



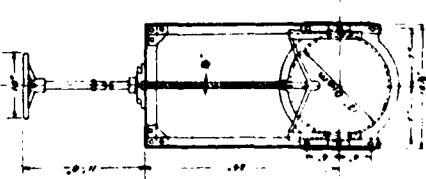
**FLOOR STRAP DETAIL**



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**NOTES -**

1. Angle "snow" the street.
2. Poor sheep the "sheep".
3. Workers and girls.
4. Angles of sheep's shell.
5. Sheep to meat.

**NOTES -**

1. Angle "Snow" the Steer.
2. Poor Snow the "Pig."
3. W. H. and S. G.
4. Angles' "Steady" Sheep.
5. Or Head Prior to inst.

**APPENDIX F**  
**HYDRAULIC AND HYDROLOGIC DATA**

## HYDRAULIC AND HYDROLOGIC ANALYSIS

According to OCE guidelines, Mary's Creek Dam No. 8 must be able to safely pass a minimum of the one-half Probable Maximum Flood ( $\frac{1}{2}$ PMF). Six hour rainfall depths for the Probable Maximum Precipitation and the 100 year rainfall were obtained from the U. S. Weather Service's Technical Paper 40. Flood routings were performed using the HEC-1-CB computer program. The program uses the dimensionless hydrograph technique described in Section 4 of the Soil Conservation Service National Engineering Handbook and the modified puls method of reservoir routing.

The peak outflow from the  $\frac{1}{2}$ PMF (AMC II) is 449 cfs. This flood overtops the dam by 0.2 feet for 1.8 hours.

Mary's Creek No. 8

SUMMARY OF ROUTINGS

EVENT	ANTECEDENT MOISTURE CONDITION	
	II	III
PMF	Overtops the dam 1.2' maximum for 3.2 hours	Overtops the dam 1.5' maximum for 3.3 hours
$\frac{1}{2}$ PMF	Overtops the dam 0.2' maximum for 1.8 hours	Overtops the dam 0.5' maximum for 2.2 hours
100 - YEAR	Maintains 5.5' of freeboard	Maintains 4.7' of freeboard

The spillways are inadequate to pass the  $\frac{1}{2}$ PMF by:

136 cfs (AMC II)  
424 cfs (AMC III)

MARY'S CREEK DAM #8

CURVE # AND LAG TIME DETERMINATION:

$$PMP = 29.7''$$

cu

LAND USE: (% OF D.A.)	PASTURE - 50%	<u>B</u>		<u>C</u>	
		62	75	60	73
	WOODLD. - 35%				
	RESIDENTIAL - 3%	75	82		
	WATER - 12%			100	

AVER. GROUND SLOPE:  $\approx 5.6\%$

HYDROLOGIC SOIL GP.

SOIL TYPES:	MEMPHIS - 64%	<u>B</u>
	LOESS - 22%	<u>B</u>
	GRENADE - 14%	<u>C</u>

$$CN = 0.50 [0.86(62) + 0.14(75)] + \\ 0.25 [0.86(60) + 0.14(73)] + \\ 0.02 [0.86(75) + 0.14(82)] + \\ 0.12 (100)$$

$$= 68 \text{ (AMC II)}$$

$$84 \text{ (AMC III)}$$

LONGEST WATER COURSE ( $L$ ) = 2600'

$$\text{LAG} = \frac{\ell^{0.8} (s+1)^{0.7}}{1900 Y^{0.5}}$$

$$= 0.41 \text{ hrs. (AMC II)}$$

$$= 0.25 \text{ hrs. (AMC III)}$$

# MARYS CREEK DAM #8

## SPILLWAY RATING

### PRINCIPAL SPILLWAY FLOW

$$D = 24"$$

$$L = 163'$$

$K_e = 0.8$  (HD 8K OF CONC. & CULV. PIPE  
HYDRAULICS - DROP INLETS &  
SAG CULVERTS P. 178)

$$K_b = 0$$

$$n = 0.012$$

$$K_p = \frac{5077 n^2}{D^{4/5}}$$

$$= \frac{5077 (0.012)^2}{24^{4/5}}$$

$$= 0.016$$

$$Q_p = A \sqrt{\frac{2gH}{1 + K_e + K_b + K_p L}}$$

$$= 2.14 \sqrt{\frac{64.4}{1 + 0.8 + 0 + 0.016 (163)}} \sqrt{H}$$

$$Q_p = 13.42 \sqrt{H}$$

LK. EL.	H	$\frac{Q_p}{Q_w}$	$\frac{Q_w}{Q_p}$
363	0	0	0
364	2	43	46
365	14	50	129
368	16.7	55	
T.D. 369.6	18.6	59	
372	21	61	

\*  $Q_p$  = PIPE FLOW

$Q_w$  = WEIR FLOW

$$= CL H^{3/2}$$

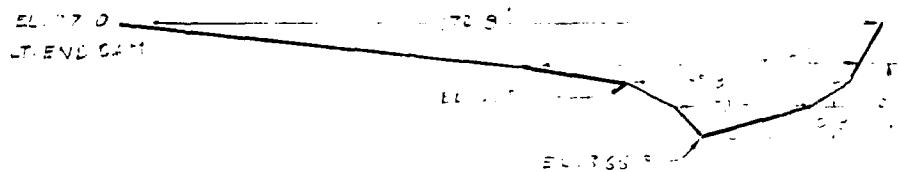
$$= 3.5 (13) H^{3/2}$$

$$= 45.5 H^{3/2}$$

### EMERGENCY SPILLWAY FLOW

$$\frac{Q^2}{g} = \frac{A^3}{T} \quad \text{FLOW = } \frac{A^3}{T} \text{ CFS}$$

LK. EL.	EL. EJECT. TEST	T	A	$\frac{Q^2}{g}$
363.0	700.0	0	0	0
364.0	707.7	7.0	2.0	0.000
370.0	719.0	47.0	7.0	0.000
372.0	725.0	7.0	7.0	0.000
374.0	731.0	7.0	7.0	0.000



NOTE: EL. OF END T. = 70.9'  
SAME AS E. OF END T. = 71.7'  
INCLUDE THE 14' E. OF THE  
END D/S OF THE END T. = 70.9'  
INCLUDE EJECT. T. = 71.7'  
T. = 7.0' + 14' = 21' = 7.0'  
(T. = 7.0').

END T. = 70.9' EJECT. T. = 71.7'  
T. = 7.0' + 14' = 21' = 7.0'

LK. EL.	EL. EJECT. TEST	T	A	$\frac{Q^2}{g}$	EL. EJECT.
363.0	700.0	0	0	0.000	700.0
364.0	707.7	7.0	2.0	0.000	707.7
370.0	719.0	47.0	7.0	0.000	719.0
372.0	725.0	7.0	7.0	0.000	725.0
374.0	731.0	7.0	7.0	0.000	731.0
376.0	737.0	7.0	7.0	0.000	737.0
378.0	743.0	7.0	7.0	0.000	743.0
380.0	749.0	7.0	7.0	0.000	749.0
382.0	755.0	7.0	7.0	0.000	755.0
384.0	761.0	7.0	7.0	0.000	761.0
386.0	767.0	7.0	7.0	0.000	767.0
388.0	773.0	7.0	7.0	0.000	773.0
390.0	779.0	7.0	7.0	0.000	779.0
392.0	785.0	7.0	7.0	0.000	785.0
394.0	791.0	7.0	7.0	0.000	791.0
396.0	797.0	7.0	7.0	0.000	797.0
398.0	803.0	7.0	7.0	0.000	803.0
400.0	809.0	7.0	7.0	0.000	809.0
402.0	815.0	7.0	7.0	0.000	815.0
404.0	821.0	7.0	7.0	0.000	821.0
406.0	827.0	7.0	7.0	0.000	827.0
408.0	833.0	7.0	7.0	0.000	833.0
410.0	839.0	7.0	7.0	0.000	839.0
412.0	845.0	7.0	7.0	0.000	845.0
414.0	851.0	7.0	7.0	0.000	851.0
416.0	857.0	7.0	7.0	0.000	857.0
418.0	863.0	7.0	7.0	0.000	863.0
420.0	869.0	7.0	7.0	0.000	869.0
422.0	875.0	7.0	7.0	0.000	875.0
424.0	881.0	7.0	7.0	0.000	881.0
426.0	887.0	7.0	7.0	0.000	887.0
428.0	893.0	7.0	7.0	0.000	893.0
430.0	899.0	7.0	7.0	0.000	899.0
432.0	905.0	7.0	7.0	0.000	905.0
434.0	911.0	7.0	7.0	0.000	911.0
436.0	917.0	7.0	7.0	0.000	917.0
438.0	923.0	7.0	7.0	0.000	923.0
440.0	929.0	7.0	7.0	0.000	929.0
442.0	935.0	7.0	7.0	0.000	935.0
444.0	941.0	7.0	7.0	0.000	941.0
446.0	947.0	7.0	7.0	0.000	947.0
448.0	953.0	7.0	7.0	0.000	953.0
450.0	959.0	7.0	7.0	0.000	959.0
452.0	965.0	7.0	7.0	0.000	965.0
454.0	971.0	7.0	7.0	0.000	971.0
456.0	977.0	7.0	7.0	0.000	977.0
458.0	983.0	7.0	7.0	0.000	983.0
460.0	989.0	7.0	7.0	0.000	989.0
462.0	995.0	7.0	7.0	0.000	995.0
464.0	1001.0	7.0	7.0	0.000	1001.0
466.0	1007.0	7.0	7.0	0.000	1007.0
468.0	1013.0	7.0	7.0	0.000	1013.0
470.0	1019.0	7.0	7.0	0.000	1019.0
472.0	1025.0	7.0	7.0	0.000	1025.0
474.0	1031.0	7.0	7.0	0.000	1031.0
476.0	1037.0	7.0	7.0	0.000	1037.0
478.0	1043.0	7.0	7.0	0.000	1043.0
480.0	1049.0	7.0	7.0	0.000	1049.0
482.0	1055.0	7.0	7.0	0.000	1055.0
484.0	1061.0	7.0	7.0	0.000	1061.0
486.0	1067.0	7.0	7.0	0.000	1067.0
488.0	1073.0	7.0	7.0	0.000	1073.0
490.0	1079.0	7.0	7.0	0.000	1079.0
492.0	1085.0	7.0	7.0	0.000	1085.0
494.0	1091.0	7.0	7.0	0.000	1091.0
496.0	1097.0	7.0	7.0	0.000	1097.0
498.0	1103.0	7.0	7.0	0.000	1103.0
500.0	1109.0	7.0	7.0	0.000	1109.0
502.0	1115.0	7.0	7.0	0.000	1115.0
504.0	1121.0	7.0	7.0	0.000	1121.0
506.0	1127.0	7.0	7.0	0.000	1127.0
508.0	1133.0	7.0	7.0	0.000	1133.0
510.0	1139.0	7.0	7.0	0.000	1139.0
512.0	1145.0	7.0	7.0	0.000	1145.0
514.0	1151.0	7.0	7.0	0.000	1151.0
516.0	1157.0	7.0	7.0	0.000	1157.0
518.0	1163.0	7.0	7.0	0.000	1163.0
520.0	1169.0	7.0	7.0	0.000	1169.0
522.0	1175.0	7.0	7.0	0.000	1175.0
524.0	1181.0	7.0	7.0	0.000	1181.0
526.0	1187.0	7.0	7.0	0.000	1187.0
528.0	1193.0	7.0	7.0	0.000	1193.0
530.0	1199.0	7.0	7.0	0.000	1199.0
532.0	1205.0	7.0	7.0	0.000	1205.0
534.0	1211.0	7.0	7.0	0.000	1211.0
536.0	1217.0	7.0	7.0	0.000	1217.0
538.0	1223.0	7.0	7.0	0.000	1223.0
540.0	1229.0	7.0	7.0	0.000	1229.0
542.0	1235.0	7.0	7.0	0.000	1235.0
544.0	1241.0	7.0	7.0	0.000	1241.0
546.0	1247.0	7.0	7.0	0.000	1247.0
548.0	1253.0	7.0	7.0	0.000	1253.0
550.0	1259.0	7.0	7.0	0.000	1259.0
552.0	1265.0	7.0	7.0	0.000	1265.0
554.0	1271.0	7.0	7.0	0.000	1271.0
556.0	1277.0	7.0	7.0	0.000	1277.0
558.0	1283.0	7.0	7.0	0.000	1283.0
560.0	1289.0	7.0	7.0	0.000	1289.0
562.0	1295.0	7.0	7.0	0.000	1295.0
564.0	1301.0	7.0	7.0	0.000	1301.0
566.0	1307.0	7.0	7.0	0.000	1307.0
568.0	1313.0	7.0	7.0	0.000	1313.0
570.0	1319.0	7.0	7.0	0.000	1319.0
572.0	1325.0	7.0	7.0	0.000	1325.0
574.0	1331.0	7.0	7.0	0.000	1331.0
576.0	1337.0	7.0	7.0	0.000	1337.0
578.0	1343.0	7.0	7.0	0.000	1343.0
580.0	1349.0	7.0	7.0	0.000	1349.0
582.0	1355.0	7.0	7.0	0.000	1355.0
584.0	1361.0	7.0	7.0	0.000	1361.0
586.0	1367.0	7.0	7.0	0.000	1367.0
588.0	1373.0	7.0	7.0	0.000	1373.0
590.0	1379.0	7.0	7.0	0.000	1379.0
592.0	1385.0	7.0	7.0	0.000	1385.0
594.0	1391.0	7.0	7.0	0.000	1391.0
596.0	1397.0	7.0	7.0	0.000	1397.0
598.0	1403.0	7.0	7.0	0.000	1403.0
600.0	1409.0	7.0	7.0	0.000	1409.0
602.0	1415.0	7.0	7.0	0.000	1415.0
604.0	1421.0	7.0	7.0	0.000	1421.0
606.0	1427.0	7.0	7.0	0.000	1427.0
608.0	1433.0	7.0	7.0	0.000	1433.0
610.0	1439.0	7.0	7.0	0.000	1439.0
612.0	1445.0	7.0	7.0	0.000	1445.0
614.0	1451.0	7.0	7.0	0.000	1451.0
616.0	1457.0	7.0	7.0	0.000	1457.0
618.0	1463.0	7.0	7.0	0.000	1463.0
620.0	1469.0	7.0	7.0	0.000	1469.0
622.0	1475.0	7.0	7.0	0.000	1475.0
624.0	1481.0	7.0	7.0	0.000	1481.0
626.0	1487.0	7.0	7.0	0.000	1487.0
628.0	1493.0	7.0	7.0	0.000	1493.0
630.0	1499.0	7.0	7.0	0.000	1499.0
632.0	1505.0	7.0	7.0	0.000	1505.0
634.0	1511.0	7.0	7.0	0.000	1511.0
636.0	1517.0	7.0	7.0	0.000	1517.0
638.0	1523.0	7.0			

MARY'S CREEK #8  
LAKE EL. VS. STORAGE

380

375

LK EL.  
(' MSL)

365

360

355

350

345 0

200 300

400

500 600

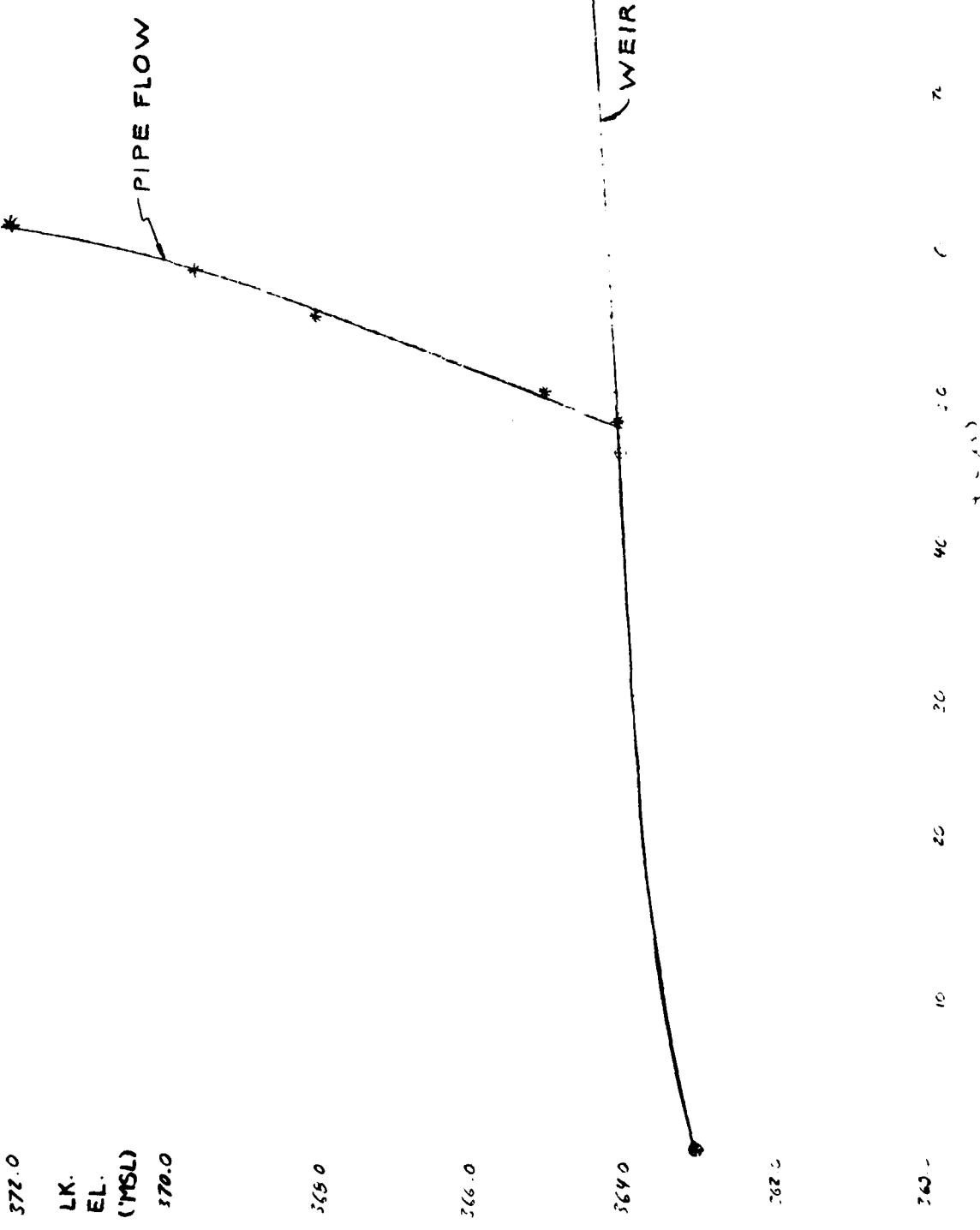
700

900

1000

STORAGE (AC-FT)

MARYS CREEK #8  
PRINCIPAL SPILLWAY  
RATING  
LAKE EL. VS. Q



MARYS CK. #8  
EMER. SPILLWAY RATING  
LAKE EL. Vs. Q

371

370

369

368

367

366

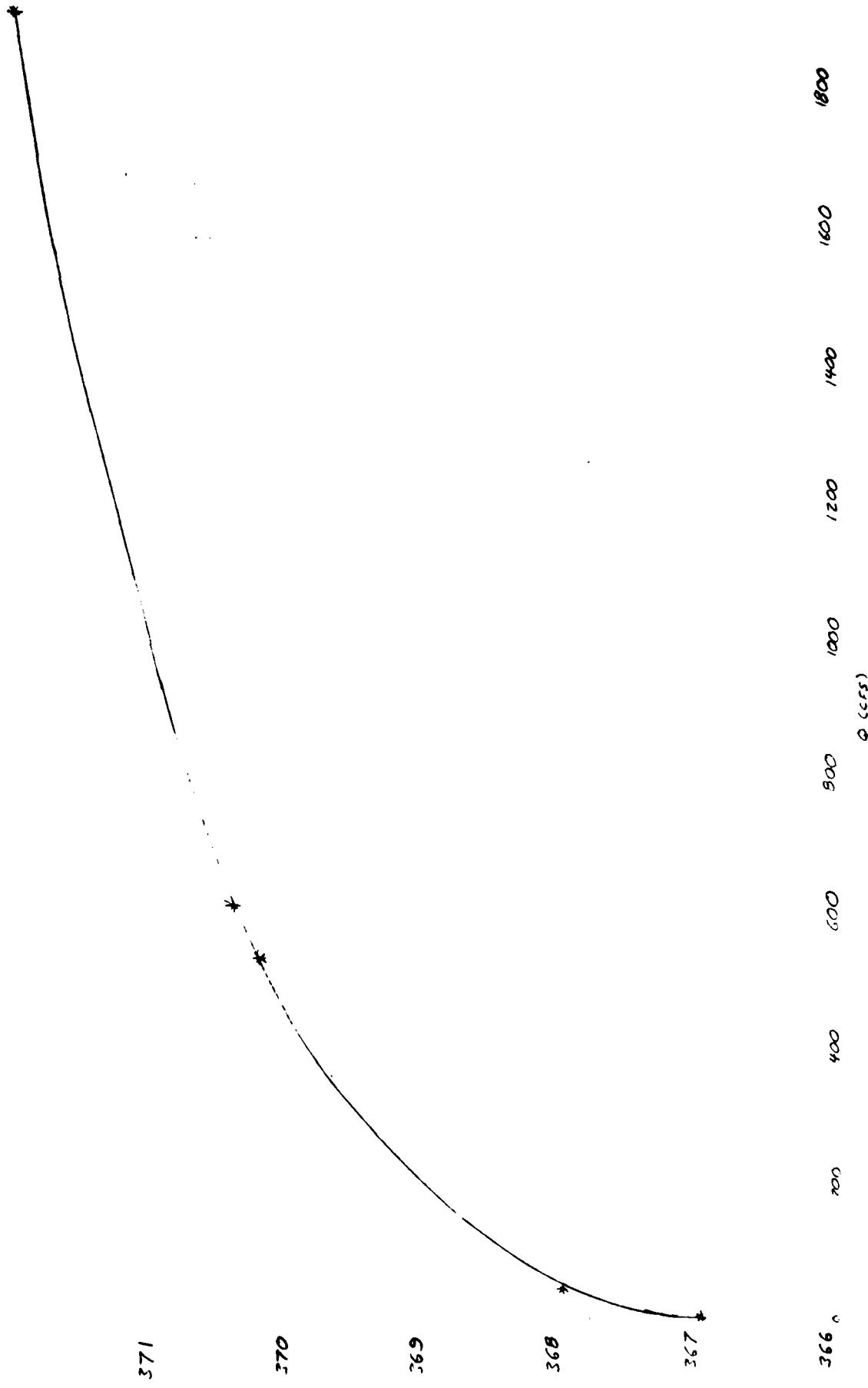
365

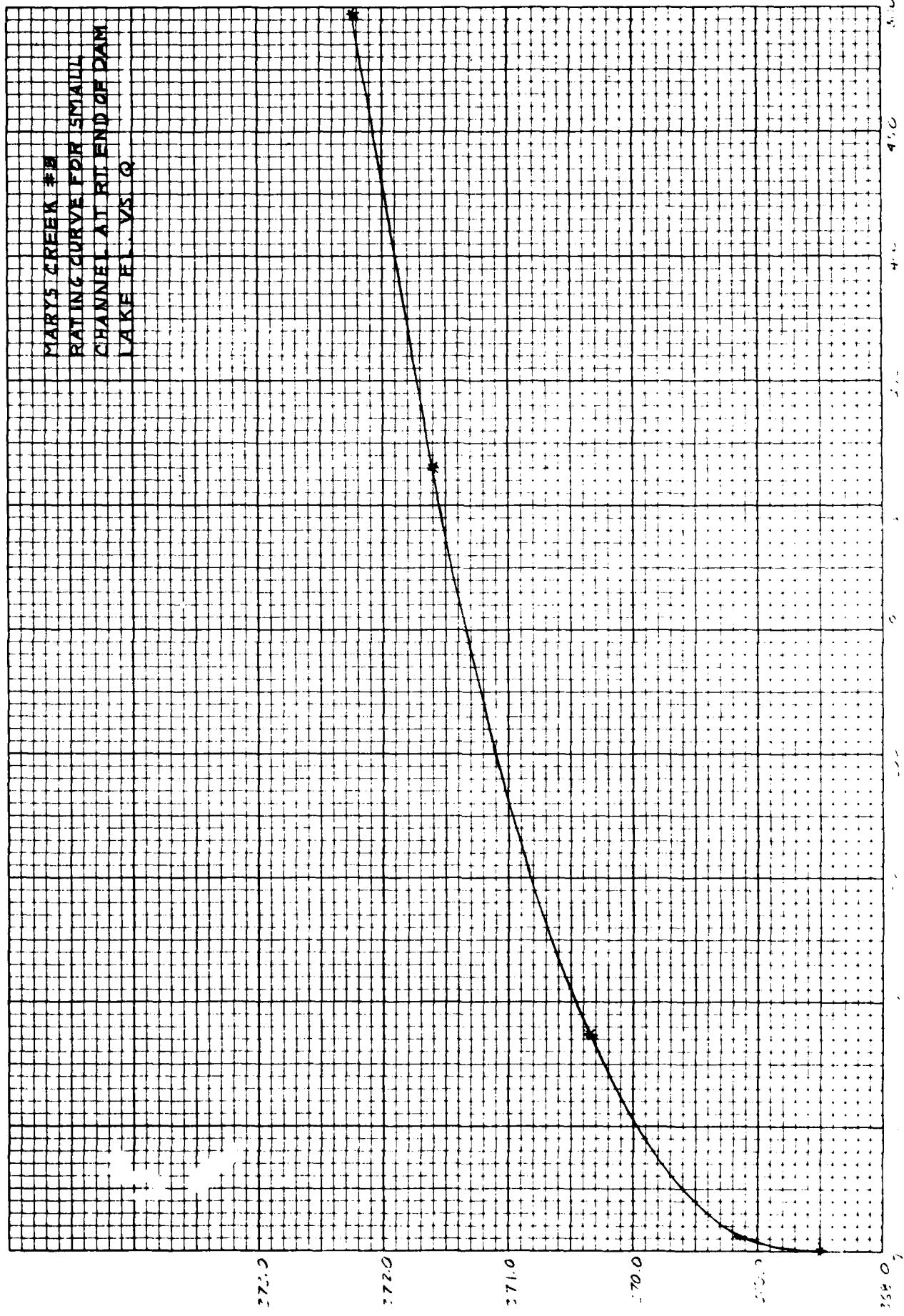
364

363

2000  
1800  
1600  
1400  
1200  
1000  
800  
600  
400  
200

Q (cfs)





372

MARY'S CREEK #8  
COMPOSITE SPILLWAY  
RATING  
LK. EL. VS. Q

370

369  
LK EL.  
(MSL)

368  
366

364  
362

LK EL.	Q
365	0
364.0	48
366.9	53
367.9	99
370.3	760
371.8	2301

360 : 200 400 600 800 1000 1200 1400 1600 1800 2000  
Q (CCFS) 900 1100 1300 1500 1700 1900 2100 2300 2500 2700

Q (CCFS)

2000

## PROGRAM PROCEDURE

### Input Sequence    Page

I	1	a) Routing inflow hydrograph through Stotts Lake Dam (Tolly Murff).  b) Routing breech hydrograph from Stotts through reach between Stotts Dam and Mary's Creek Reservoir.  c) Combing inflow hydrograph to Mary's Creek No. 8 and breech hydrograph from Stotts.  d) Routing composite inflow through Mary's Creek Dam.
II	9	Same sequence as above for AMC III condition.
III	11	Standard inflow hydrograph routing through Mary's Creek Dam assuming Stotts Lake does not exist. <sup>1</sup>
IV	13	Same procedure as above for AMC III condition.

<sup>1</sup>This is a reasonable approximation if Stotts Dam does not breech. It is a conservative approach from a design standpoint (i.e., it gives higher flow values) because spillway outflow will not exceed the inflow that is assumed if the dam is absent, until the dam overtops.



DE (HEC-1)  
 D-10 SAFETY VERSION  
 LAST MODIFICATION 01 APR 80  
 RUN DATEX 81/06/09.  
 TIMES 06.59.06.

MARYS CREEK AND TOLLY MURFF DAMS  
 SHELLY CO.  
 HEC-11

NO	NHHR	NMIN	IDAY	JOB SPECIFICATION
100	0	6	0	IHR IMIN METRC
			0	0 0 TRACE
			5	0 0

MULTI-PLAN ANALYSES TO BE PERFORMED  
 M-PLAN- 1 NRTO= 3 LRTD= 1  
 RT105- .09 .50 1.00

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SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH COMPUTATIONS FOR TOLLY MURFF

1STAO	ICOMP	IECON	ITAPE	JPLT	INAME	ISAGE	IAUTO	
1	0	0	0	0	0	0	0	
HYDGC	TUNG	TAREA	SMAP	HYDROGRAPH DATA	RATIO	ISNAME	LOCAL	
1	2	.06	0.00	TRSDA TRSPC	0.000	0	0	
SPFE	PMS	R6	R12	R24	R48	R72	R96	
0.00	29.76	100.00	101.00	102.00	0.00	0.00	0.00	
UROPT	STRKR	DLTKR	RTOL	ERAIN	LOSS DATA	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	RTIOK	1.00	-1.00	-71.00

E>

## HYDROGRAPH ROUTING

ROUTING FLOW THROUGH TOLLY RUMPT

	I STG <sub>1</sub>	I COMP	I ECON	I TPE	J RT	J RT	J NAME	I STG <sub>2</sub>	I TPE <sub>2</sub>
STAGE	387.00	387.80	389.00	390.00	391.00	392.	393.	394.	395.
FLOW	0.00	25.00	173.00	567.00	1124.00				
CAPACITY	0.	40.	64.						
ELEVATION	372.	387.	390.	400.					
OLSS	0.000	0.000	0.000	0.000	0.000				
NSTS <sub>1</sub>	1	1	1	1	1				
NSTS <sub>2</sub>	1	1	1	1	1				
LSTG <sub>1</sub>									
LSTG <sub>2</sub>									
SPUD									
CREL									
CREL <sub>1</sub>									
CREL <sub>2</sub>									
COOL									
EMPU									
ELEV									
COOL									
EMPU									
ELEV <sub>1</sub>									
ELEV <sub>2</sub>									
EXPL									
TSK									
STRA									
IMP									
-387.									
-388.5%									

	TOPF	COOF	EXPD	DAMID
CREST LENGTH AT OR BELOW ELEVATION	388.9	3.1	1.5	422.
BRUH	19.	2	DAM BREACH DATA	
ELBN	1.00	371.90	TFAIL	422.
	.50		UEEL	387.00
				388.5%

PEAK OUTFLOW IS 16. AT TIME 16:00 HOURS

BEGIN DAM FAILURE AT 15:00 HOURS

PEAK OUTFLOW IS 1856. AT TIME 16:24 HOURS

BEGIN DAM FAILURE AT 15:50 HOURS

PEAK OUTFLOW IS 2662. AT TIME 15:

E&gt;

ROUTING

ROUTING

ROUTING

ROUTING OF BREACH HYDROGRAPH THROUGH REACH BETWEEN RESERVOIRS

ROUTING	ISPEC	ICOMP	IECOM	ITAPE	JPLT	JPT	INAME	ISTOP	IINFO
0.0	0.000	0.00	0.00	ROUTING DATA	0	0	IPMP	LSTP	0
0.0	0.000	0.00	0.00	IES ISAM	1	0	IPPT	LSPT	0
0.0	0.000	0.00	0.00	NSTDL	LAG	AMSKX	TSK	STORM	ISPART
0.0	0.000	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000

NORMAL DEPTH CHANNEL ROUTING

ON(1)	ON(2)	ON(3)	ELMIN	ELMAX	RLNTH	SEL
0.0250	0.0250	0.0250	363.0	380.0	870.	.01020

CROSS SECTION COORDINATES--STA, ELEV, STA, ELEV--ETC
0.00 385.00 108.00 374.00 215.00 363.00 363.00 363.00
507.00 374.00 564.00 380.00 620.00 385.00

STORAGE	0.00	3.36	7.04	11.04	15.35	19.99	24.95	29.23	35.82
41.74	47.98	54.53	61.41	68.60	76.11	83.92	92.04	100.47	108.20
118.25	0.00	916.64	2980.23	5988.73	9821.35	14733.30	20435.87	27039.12	34558.38
OUTFLOW	43012.27	52421.67	62808.55	74197.51	87613.94	102558.69	118656.97	135935.91	154424.41
195120.70	0.00	363.00	363.89	364.79	365.68	366.58	367.47	368.37	369.26
STAGE	371.05	371.95	372.84	373.74	374.63	375.53	376.42	377.32	378.21
380.00	43012.27	52421.67	62808.55	74197.51	87613.94	102558.69	118656.97	135935.91	154424.41
FLDN	195120	0.00	916.64	2980.23	5988.73	9821.35	14733.30	20435.87	27039.12
43012.27	52421.67	62808.55	74197.51	87613.94	102558.69	118656.97	135935.91	154424.41	174144.29

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CREST LENGTH  
 AT OR BELOW ELEVATION 0. 550. 1000. 1120.  
 PEAK OUTFLOW IS 369.6 370.0 370.5 371.0  
 AT TIME 18.50 HOURS  
 PEAK OUTFLOW IS 585. AT TIME 17.30 HOURS  
 PEAK OUTFLOW IS 3708. AT TIME 16.20 HOURS

\*\*\*\*\*

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS  
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)  
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	RATIOS APPLIED TO FLOWS			
			PLAN	RATIO 1	RATIO 2	RATIO 3
HYDROGRAPH AT	1	.96 .17)	1 (	.71; 2.00)(	.380; 10.77)(	.761; 21.55)(
ROUTED TO	2	.96 .17)	1 (	.16; .46)(	.1670; 47.29)(	.2573; 72.87)(
ROUTED TO	3	.96 .17)	1 (	.16; .46)(	.1726; 48.87)(	.2461; 69.68)(
HYDROGRAPH AT	4	.38 .99)	1 (	.309; 8.76)(	.1663; 47.69)(	.3326; 94.19)(
2 COMBINED	5	.45 1.16)	1 (	.324; 9.18)(	.2803; 79.37)(	.5767; 163.31)(
ROUTED TO	6	.45 1.16)	1 (	.48; 1.37)(	.585; 16.58)(	.3708; 104.99)(

1. Summary of Dam Safety Analysis

INITIAL VALUE SPILLWAY CREST TOP OF DAM  
 PLAN 1 .....  
 E>

1.50 1726. 364.2 16:30  
1.00 2461. 364.6 15:30

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM	DURATION OVER TOP HOURS	MAX OUTFLOW CFS	DURATION OVER TOP HOURS	MAX OUTFLOW CFS	TIME OF FAILURE HOURS
RATIO OF PWF TO U.S. ELEU	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS					
.69	364.13	0.00	189.	48.	0.00	18.50	0.00	
.50	369.82	.22	398.	585.	1.80	17.30	0.00	
1.00	370.81	1.21	449.	708.	3.20	16.20	0.00	

FLOOD HYDROGRAPH PACKAGE (HEC-1)  
DAM SAFETY VERSION JULY 1978  
LAST MODIFICATION 01 APR 86  
E01.

## MARY'S CREEK AND TOLLY MURFF DAMS

SHEDY CO.

ANC III

6

E01.

4

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## INFLOW HYDROGRAPH COMPUTATIONS FOR TOLLY MURFF

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## ROUTING FLOW THROUGH TOLLY MURFF

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## ROUTING FLOW THROUGH TOLLY MURFF

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1.00 SUMMARY OF DAM SAFETY ANALYSIS 364.6 15.70

PLAN 1 .....	ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
		363.66 148. 0.	363.66 148. 0.	369.66 382. 448.
RATIO OF PF	MAXIMUM RESERVOIR U.S. ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	DURATION OVER TOP OF DAM HOURS
.13	364.91	0.00	216.	5.00
.50	370.95	0.46	499.	873.
1.00	371.67	1.47	465.	5197.
				3.39
				15.90

FLOOD HYDROGRAPH PACKAGE (HEC-1)  
 DAM SAFETY VERSION JULY 1978  
 LAST MODIFICATION 01 APR 80  
 EOL



## SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

INITIAL VALUE  
363.00  
STORAGE  
149.  
OUTFLOW  
0.

RATIO OF PIF TO U.S. ELEV	MAXIMUM RESERVOIR DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.99	364.01	0.00	185.	48.	0.00	18.40
.50	368.89	0.00	357.	271.	0.00	18.40
1.00	370.42	.82	424.	1871.	3.00	16.40

FLOOD HYDROGRAPH PACKAGE (HEC-1)  
DAM SAFETY VERSION  
LAST MODIFICATION 01 APR 80  
EOI.  
E>

MARY'S CREEK DAM #8  
SHELBY CO.

A2	109							
A3	109	5						
B1			3	1				
J1	0.133		0.5	1				
K1					INFLOW HYDROGRAPH COMPUTATIONS FOR MARY'S CREEK			
P1						1		
T1							1	
U1								-84
X1								
Y1								
Z1								
A1	109	5	3	1				
B1			0.5	1				
C1					ROUTING THROUGH MARY'S CREEK			
D1						1		
E1							1	
F1								-1
G1								
H1								
I1								
J1								
K1								
L1								
M1								
N1								
O1								
P1								
Q1								
R1								
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V1								
W1								
X1								
Y1								
Z1								
A2	109	5	3	1				
B2			0.5	1				
C2					ROUTING THROUGH MARY'S CREEK			
D2						1		
E2							1	
F2								-1
G2								
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Q2								
R2								
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V2								
W2								
X2								
Y2								
Z2								
A3	109	5	3	1				
B3			0.5	1				
C3					ROUTING THROUGH MARY'S CREEK			
D3						1		
E3							1	
F3								-1
G3								
H3								
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J3								
K3								
L3								
M3								
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Q3								
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A4	109	5	3	1				
B4			0.5	1				
C4					ROUTING THROUGH MARY'S CREEK			
D4						1		
E4							1	
F4								-1
G4								
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Q4								
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A5	109	5	3	1				
B5			0.5	1				
C5					ROUTING THROUGH MARY'S CREEK			
D5						1		
E5							1	
F5								-1
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J5								
K5								
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P5								
Q5								
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A6	109	5	3	1				
B6			0.5	1				
C6					ROUTING THROUGH MARY'S CREEK			
D6						1		
E6							1	
F6								-1
G6								
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A7	109	5	3	1				
B7			0.5	1				
C7					ROUTING THROUGH MARY'S CREEK			
D7						1		
E7							1	
F7								-1
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J7								
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A8	109	5	3	1				
B8			0.5	1				
C8					ROUTING THROUGH MARY'S CREEK			
D8						1		
E8							1	
F8								-1
G8								
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## SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....	ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM	DURATION OVER TOP HOURS	TIME OF OUTFLOW HOURS	TIME OF FAILURE HOURS
RATIO OF PMF	MAXIMUM RESERVOIR U.S. ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS			
.13	364.71	0.00	200.	49.	0.00	18.30	0.00
.50	369.25	0.00	369.	333.	0.00	18.20	0.00
1.00	370.67	1.07	439.	2949.	3.00	16.00	0.00

FLOOD HYDROGRAPH PACKAGE (HEC-1)  
 DAM SAFETY VERSION JULY 1978  
 LAST MODIFICATION 01 APR 89  
 E01.  
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## HYDRAULIC AND HYDROLOGIC ANALYSIS

According to OCE guidelines, Stotts Dam must be able to safely pass a minimum of the one-half Probable Maximum Flood ( $\frac{1}{2}$ PMF). Six hour rainfall depths for the Probable Maximum Precipitation and the 100 year rainfall were obtained from the U. S. Weather Service's Technical Paper 40. Flood routings were performed using the HEC-1-DB computer program. The program uses the dimensionless hydrograph technique described in Section 4 of the Soil Conservation Service National Engineering Handbook and the modified puls method of reservoir routing.

The peak outflow from the  $\frac{1}{2}$ PMF (AMC II) is 202 cfs. This flood overtops the dam by 0.2' for 30 minutes.

Stotts Lake Dam

SUMMARY OF ROUTINGS

EVENT	ANTECEDENT MOISTURE CONDITION	
	II	III
PMF	Overtops by maximum of 1.0' for 2.1 hours	Overtops by maximum 1.1' for 2.2 hours
$\frac{1}{2}$ PMF	Overtops by maximum 0.2' for 30 minutes	Overtops by maximum 0.3' for 0.7 hours
100 - YEAR	1.3' of freeboard is maintained	1.0' of freeboard is maintained

Spillway is inadequate to pass the  $\frac{1}{2}$ PMF by:

50 cfs (AMC II)  
95 cfs (AMC III)

CURVE NUMBER & LAG TIME DETERMINATION FOR STOTTS

PMP = 29.7"

LAND USE:		CN	
		B	C
18%	WOODED	60	72
2%	RESIDENTIAL OR HARD SURFACE	75	32
16%	WATER	100	100
64%	PASTURE	62	75

SOIL TYPES

HYDROLOGIC SOIL GROUP

25% GRENADA	C
60% MEMPHIS	B
15% LORING	3

$$\begin{aligned}
 CN = & 0.18 [ 0.75(60) + 0.25(75) ] + \\
 & 0.22 [ 0.75(75) + 0.25(82) ] + \\
 & 0.64 [ 0.75(62) + 0.25(75) ] + \\
 & 0.16 [ 100 ]
 \end{aligned}$$

$$\begin{aligned}
 &= \underline{\underline{72}} \quad (\text{C-H-C II}) \\
 &= \underline{\underline{96}} \quad (\text{C-H-C III})
 \end{aligned}$$

$$1000 \text{ ft } \times 1000 \text{ ft } \times 10' \rightarrow 1000'$$

$$\text{LAG} = \frac{C^{0.3} (S+1)^{0.7}}{1000' Y^{0.5}}$$

$$S = \frac{1000'}{10'} - 10$$

$$\text{LAG} = \frac{1200^{0.3} (40)^{0.7}}{1000' (5.0)^{0.5}}$$

$$= 0.202 \text{ hrs. (C-H-C II)}$$

$$= 0.127 \text{ hrs. (C-H-C III)}$$

SPILLWAY RATING FOR STORFS

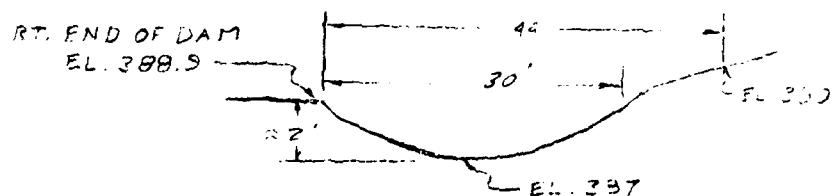
<u>ELEV. (MSL)</u>	<u>AREA (D')</u>	<u>STORAGE (AC-FT)</u>
371.9	0	0
387	6.6	40
390	9.2	64
400	19.3	206

ASSUMING PARABOLIC CROSS-SEC. FROM ELEVS. 387 TO 371

USE EQUATION FOR HYD. HEAD, DEPTH IN PARABOLIC SHP. AND FLOW DENSITY

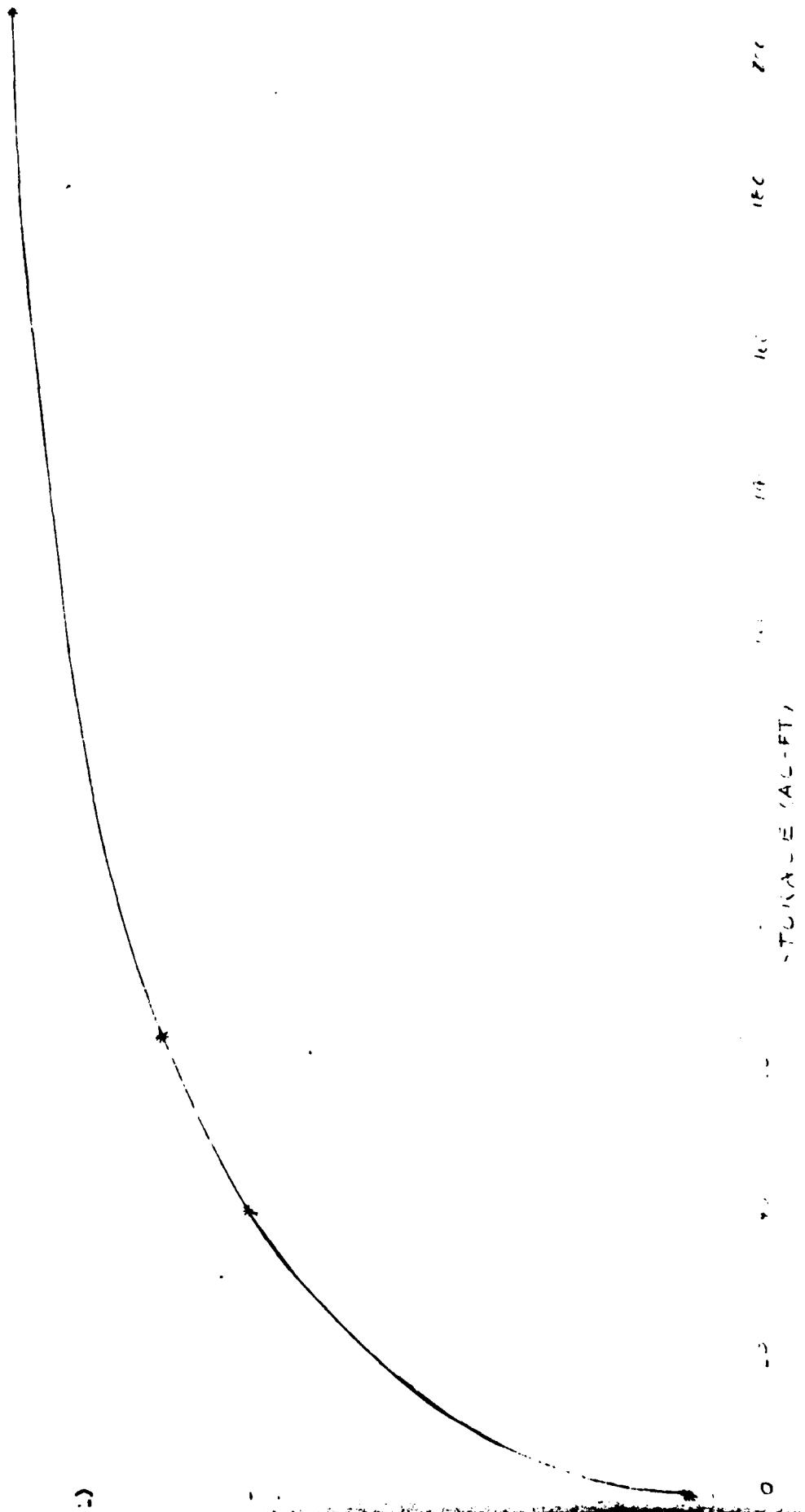
$$Q_{\text{par.}} = 2.005 T H_{n1}^{3/2} \quad Q_{\text{irr.}} = \sqrt{\frac{g A^2}{T}}$$

<u>LK. E.L.</u>	<u>H<sub>n1</sub>'</u>	<u>T'</u>	<u>Q(1/1)</u>	<u>A (ft<sup>2</sup>)</u>
387	0	0	0	
387.5	0.6	17.5	25	
390	2	22.5	172	
390	3	44	567	76
392	4	44*	1124	120

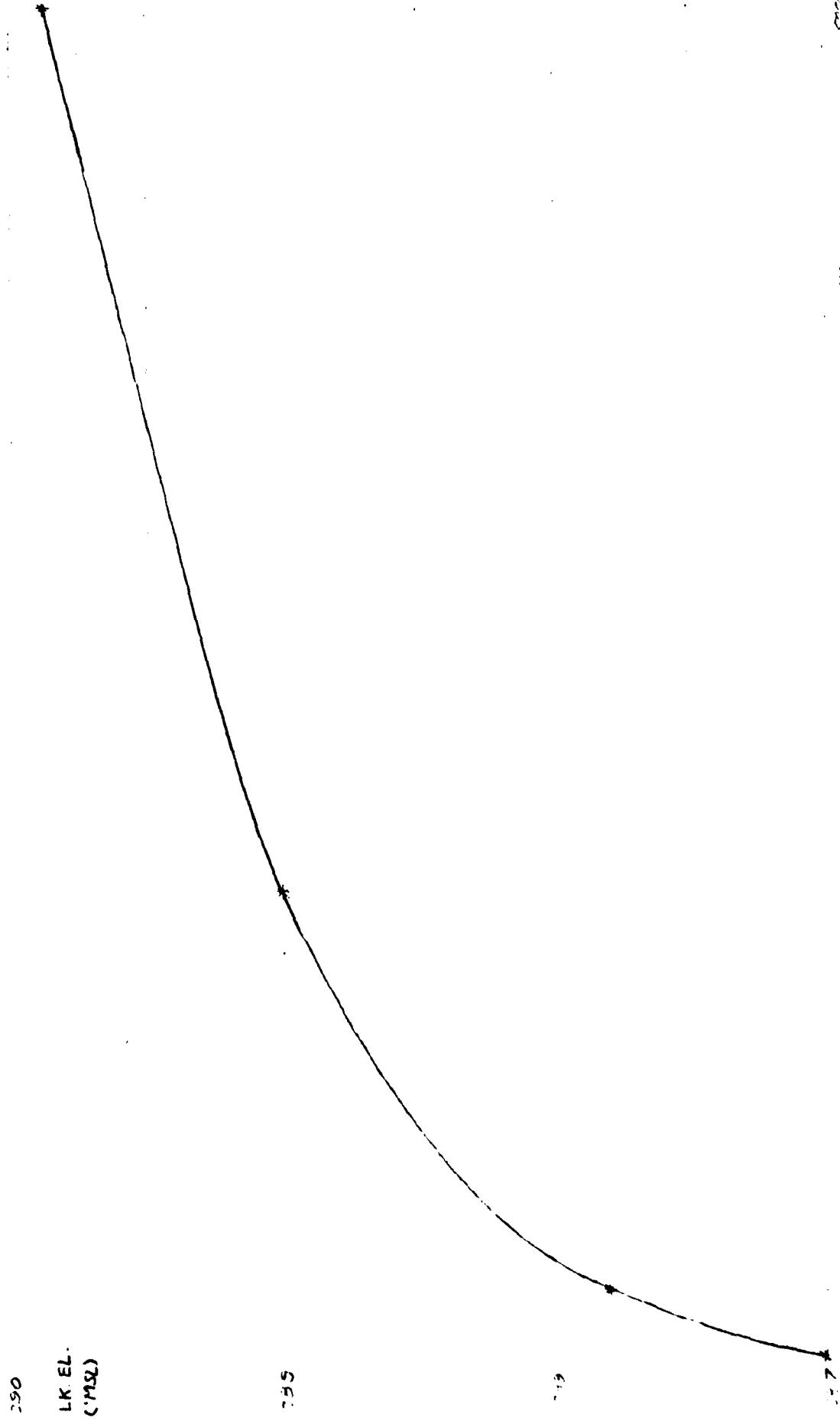


\* ASSUMING THAT AT ELEVATIONS OVER 390 THE SPILLWAY FLOW RATE IS THE SAME AS THE SPILLWAY FLOW RATE AT EL. 390. BY EXTRAPOLATING THE DATA, IT CAN BE SEEN THAT THE SPILLWAY FLOW RATE AT EL. 392 IS APPROXIMATELY 1.5 TIMES THE SPILLWAY FLOW RATE AT EL. 390. THIS IS INCONSEQUENTIAL IN THIS CASE SINCE THE SPILLWAY FLOW RATE AT EL. 392 IS APPROXIMATELY 1.5 TIMES THE SPILLWAY FLOW RATE AT EL. 390.

STOTTS LAKE DAM  
STAGE vs. STORAGE



STOTTS LK. DAM  
SPILLWAY RATING  
LAKE EL. VS. Q



STOTT'S LANE DRY  
SHELBY CO.  
AND II

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FLOOD HYDROGRAPH PACKAGE (HEC-1)  
DATA SHEET  
LAST MODIFICATION: 01-JULY-1978

DATE 01/05/18  
TICKET # 112514218528

STOTTS LAKE DAM  
SHELBY CO.

NO	NHR	MIN	IDAY	JOPER	JMIN	JINR	MTRC	IPLT	IPRT	INSTAN	Q
100	6	6	0	5	0	0	0	0	4	0	0

### MULTI-PLAN ANALYSES TO BE PERFORMED

CHIEF-OF-STAFF COMPUTATION

INFLUX HYDROGRAPH COMPUTATIONS FOR STOTS									
IMHYC	IUNG	TAREA	SNAP	ITAPE	JPLT	JFRT	INAME	ISTAGE	IAUTO
HYDROGRAPH DATA									
SPPFE	PM5	R6	PREC.P	DATA	R48	R72			
0.00	29.79	100.00	101.00	102.00	0.00	0.00			

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CURVE NO. -71.00 LENGTH - 1.00 EFFECT CN - 71.00

TC. 0.00 UNIT HYDROGRAPH DATA  
LAG. .20

RECEDITION DATA  
GROWTH 1.00

STAGE 0.00 END-OF-PERIOD FLOW  
LOSS 0.00 NO.DA

HR.MN PERIOD RAIN EXCS LOSS COMP 0

END-OF-PERIOD FLOW  
NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP 0

SUM 36.29 25.89 4.49 16577.1  
( 769.1( 652.1( 112.1( 362.34)

ROUTING FLOW THROUGH STOTS

	1STAG	ICOMP	IICON	ITYPE	JPT	JRT	INME	ISAGE	IAUTO
	2	1	0	0	1	0	1	0	0
	CLASS	MIG	INES	ISATE	ROUTING DATA	1OPT	IMPP	LSTR	
STAGE	367.00	367.00	367.00	367.00	LAG 0	ANMAX 0.000	0.000	TSX 0.000	STORM -367.000
FLOW	0.00	25.00	173.00	567.00					ISPMAT -367.000
CAPACITY	0.	40.	64.	206.					
ELEVATION	372.	367.	390.	400.					
	367.0	SPUD 0.0	COUP 0.0	EXPU 0.0	ELEV 0.0	COOL 0.0	CAREA 0.0	EXPL 0.0	
									DAM DATA
									TOPEL COAD EXPD DAMRD

SUMMARY OF THE BRIEFLY MENTIONED

PLAN	1 . . . . .	ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
			387.00	387.00	388.90

RATIO OF PWF	MAXIMUM RESERVOIR U.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	MAX OUTFLOW HOURS	TIME OF FAILURE HOURS	COST (\$)
.10	387.58	.00	45.	18.	0.00	16.60	0.00	0.00
.50	389.57	.17	56.	202.	.54	16.60	0.00	0.00
1.00	389.57	.97	63.	612.	2.10	15.90		

FLOOD HYDROGRAPH PACKAGE (ME-1)  
DEM SAFETY VERSION JULY 1978  
LAST MODIFICATION 6 APR 80  
EXCELSIOR EDITIONS INC.  
EOL.

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SOCIETY OF THE SOCIETIES

PLAN	1	ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF Dam
			387.00	387.00	387.00
			40.	40.	55.
			6.	6.	61.
RATIO OF PWF	MAXIMUM RESERVOIR U.S. ELEV	MAXIMUM DEPTH OVER Dam	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	MAX OUTFLOW HOURS
.14	387.87	0.00	47.	33.	16.10
.50	389.17	0.27	57.	245.	15.90
1.00	390.02	1.12	64.	711.	15.80
FLOOD HYDROGRAPH PACKAGE (HEC-1) DAM SAFETY VERSION LAST MODIFICATION 01 APR 88 EOI.					
EXCE7, STOTTS CXCNE, STOTTS EX-28					
STOTTS LANE Dam SHELBY CO. ARC III					
6					
1	0.143	0.5	1		
1	0.143	0.5	1		
1	0.127	1.5			-86
1	0.127	1.5			-1
1	ROUTING FLOW THROUGH STOTTS	1	1		-387
1	387.8	389	389	389	1
1	388.5	389	389	389	1
1	389.2	389	389	389	1
1	390.0	389	389	389	1
1	390.7	389	389	389	1
1	391.4	389	389	389	1
1	392.1	389	389	389	1
1	392.8	389	389	389	1
1	393.5	389	389	389	1
1	394.2	389	389	389	1
1	395.0	389	389	389	1
1	395.7	389	389	389	1
1	396.5	389	389	389	1
1	397.3	389	389	389	1
1	398.0	389	389	389	1
1	398.7	389	389	389	1
1	399.5	389	389	389	1
1	399.9	389	389	389	1
1	399.9	389	389	389	1

**APPENDIX G**  
**CORRESPONDENCE**



TENNESSEE DEPARTMENT OF CONSERVATION  
DIVISION OF WATER RESOURCES  
4721 TROUSDALE DRIVE, NASHVILLE 37220  
615/741-6860

Certified

December 1, 1980

Mr. L. E. Bryan  
1371 West Crestwood Dr.  
Memphis, TN 38117

Dear Dam Owner:

As provided by the State Safe Dams Act, Tennessee Code Annotated, Sections 70-2501 to 70-2530, non-federal dams in Tennessee must be inspected and certified for safety by our agency. According to our records, you are identified as the owner of Mary's Creek #8 Dam, located in Shelby County, Tennessee. Enclosed for your information and review is a copy of our inventory record on the structure along with a copy of the Act and adopted rules and regulations.

Tentative plans are to schedule a safety inspection of your dam within the next few months. A staff engineer will very shortly be in further communication with you to discuss the pending inspection and your responsibilities under the Safe Dams Act. Your immediate attention, however, is called to the matter of maintaining the earthen dam with a good grass cover and clear of all brush, undergrowth and tree growth. If these conditions do not presently exist, please make plans to remove the brush, undergrowth and all trees less than two inches in diameter as soon as possible. Larger trees may have to be removed at a later date but must be done so under the direction of an experienced engineer.

Please let me, or our Chief Engineer, Mr. Ed O'Neill, know of any assistance we might be.

Very truly yours,

Robert A. Hunt, P.E.  
Director, Division of Water Resources

RAH:lt

Enclosures

ORNED-C

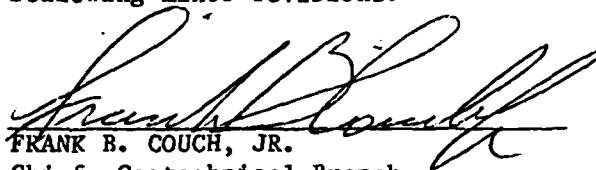
NON-FEDERAL DAM INSPECTION REVIEW BOARD  
PO BOX 1070  
NASHVILLE, TENNESSEE 37202

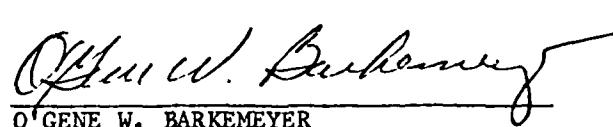
Commander, Nashville District  
US Army Corps of Engineers  
PO Box 1070  
Nashville, TN 37202

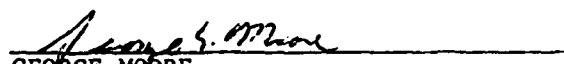
1. The Interagency Review Board, appointed by the Commander on 19 June 1981, presents the following recommendations after meeting on 30 July 1981, to consider the Phase I investigation report on Mary's Creek Watershed Dam No. 8, inspected by the Tennessee Department of Conservation.
2. The data relating to the failure of Stott's Dam through structural failure alone or through failure during the 1/2 PMF should be included in the report.
3. The report should conclude that the dam would probably not fail if it were overtopped by 0.2 ft for 1.8 hours during the 1/2 PMF.
4. A qualified engineer should be engaged to perform an embankment stability analysis to determine if the dam meets seismic stability requirements.
5. Recommendation "d" should be revised to include the services of a qualified engineer to investigate the feasibility of lowering the water level in the stilling basin. The engineer should also investigate and make recommendations for the repair of the drawdown facilities.

ORNED-G  
Commander, Nashville District  
US Army Corps of Engineers

6. The Board is in agreement with other report conclusions and recommendations following minor revisions.

  
FRANK B. COUCH, JR.  
Chief, Geotechnical Branch  
Chairman

  
O'GENE W. BARKEMEYER  
State Conservation Engineer  
Soil Conservation Service

  
GEORGE MOORE  
Alternate, Division of Water Resources  
State of Tennessee

  
H. F. PHILLIPS  
Chief, Hydraulics Section  
Alternate, Hydrology and Hydraulics  
Branch

  
EDWARD B. BOYD  
Hydrologic Technician  
Alternate, US Geological Survey

  
BRADLEY B. HOOT  
Chief, Structural Section  
Alternate, Design Branch